VideoPath™ VLX-10 & VLX-20

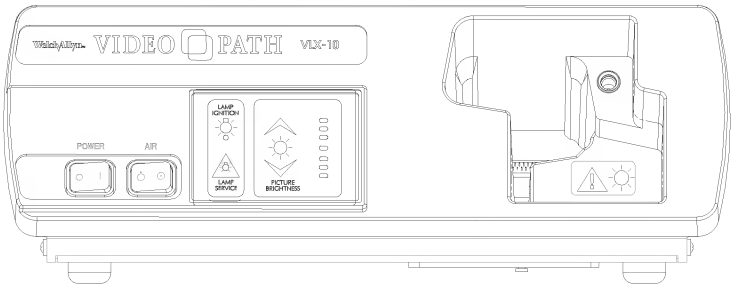
Light Source

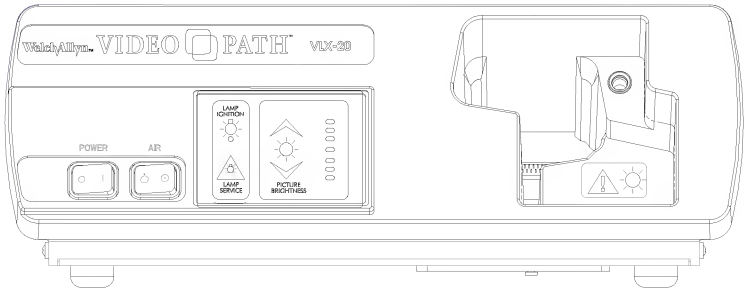
Light Source Menu

VLX10 Operation Manual

VLX20 Operation Manual

Service Manual





WelchAllyn™

Welch Allyn Inc.
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Part No. 455007 **Rev. B**

Rev.	Description of Change	ECN #	Date	Initiator
A	New Release	S-33314	8/7/96	M Dahlin
B	Update section 3 & dwg Rev's	S-33896	10/18/96	M Dahlin

To Service Personnel:

The information in this manual is subject to change without notice and should not be construed as a commitment by Welch Allyn, Inc.

Welch Allyn assumes no responsibility for any errors that may appear in this manual. If the product and/or its operation varies significantly from any description herein, please contact the Welch Allyn Imaging Products Service Department at 4341 State Street Road, Skaneateles Falls, New York 13153-0220, 1 800 669-9771, (315) 685-4445

This product has been designed to provide a high degree of safety and reliability. However, we can not guarantee against the deterioration of components due to aging and normal wear.

All service and repairs must be performed by authorized Welch Allyn personnel or agents, using Welch Allyn replacement parts. Failure to do so will invalidate the product warranty.

Authorized service centers should refer to repair specification for proper test and device history record requirements.

Please refer to the product warranty for specific coverage.

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Limited Warranty

Welch Allyn warrants the VideoPath , when new, to be free of defects in material and workmanship and to perform in accordance with manufacturer's specifications when subjected to normal use and service for a period of one year from the date of purchase from Welch Allyn or an authorized agent. Welch Allyn will either repair or replace any components found to be defective or at variance from manufacturer's specifications within this time at no cost to the customer. It shall be the purchaser's responsibility to return the instrument directly to their authorized distributor, agent, or service representative.

This warranty does not cover the Hi-LUX lamp, breakage, or failure due to tampering, misuse, neglect, accidents, improper installation, modification, or shipping, or to improper maintenance, service, and cleaning procedures. This warranty is also void if the instrument is not used in accordance with manufacturer's recommendations or if repaired or serviced by other than Welch Allyn or an authorized agent. Purchase date determines warranty requirements. No other express or implied warranty is given.

For service assistance or questions regarding this warranty, please call Welch Allyn Medical Technical Service Department at 1 800 669-9771, or (315) 685-4445.

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Section

1

General Information

Introduction

Basic System Description

The VideoPath Sigmoidoscope Video Imaging System is comprised of two major components: a power supply/light source and a video sigmoidoscope.

The power supply/light source provides the light, air, and video pass through for the system. The light is provided by two patented Welch Allyn arc lamps. Rated at 21 watts, these generate the same output as a high wattage Xenon arc lamp while only producing a fraction of the heat. The lamp is designed to focus 90% of its available light on the fiber bundle used for transferring light through the sigmoidoscope. Power is supplied to the system using a universal switching medical grade power supply. This power supply provides the DC voltages necessary to run the light source as well as the scope. Light control and video pass through is accomplished through the use of a light control/video output board. This board provides the circuitry necessary to supply the appropriate video exposure levels. In addition to providing light, power, light control, and a video pass through to a monitoring device, the light source, using an electric motor driven pump, provides air for, irrigation, insufflation, and other procedure related functions.

The sigmoidoscope utilizes a high performance CCD imager at the distal end of the scope. A video board set provides the electronics for microprocessor managed illumination control and processing circuitry. The scope is also equipped with a fiber bundle for light transmission. Also present is the articulation control, water and air control and delivery, and a biopsy channel for the passage of accessories through the instrument.

Major Component Description: Light Box

The VideoPath VLX-10/20 Light Source is driven by a universal switching power supply, which accepts 100-240 VAC, 50-60 Hz without having to be adjusted. This power supply automatically senses line voltage and makes the correct adjustments for any line input. The power supply is medical grade and is approved for medical standards by UL, CSA, and TUV. Power is supplied for two primary functions: lighting and video processing.

For illumination, two proprietary ballasts are used to ignite and operate the lamps. The lamps used in the VLX-10/20 are a proprietary Welch Allyn miniature arc lamp, providing superior illumination in a package a fraction the size of the typical intraoral light source. Both the lamp and the ballast are manufactured by Welch Allyn.

Power is also supplied to the scope via a hypertronic connector interface located in the endoscope connector port. A video output and light control board provides the S-video, RGB, and composite video signal pass through and outputs. Front and rear panel diagrams are shown on the next page in figure 1-1.

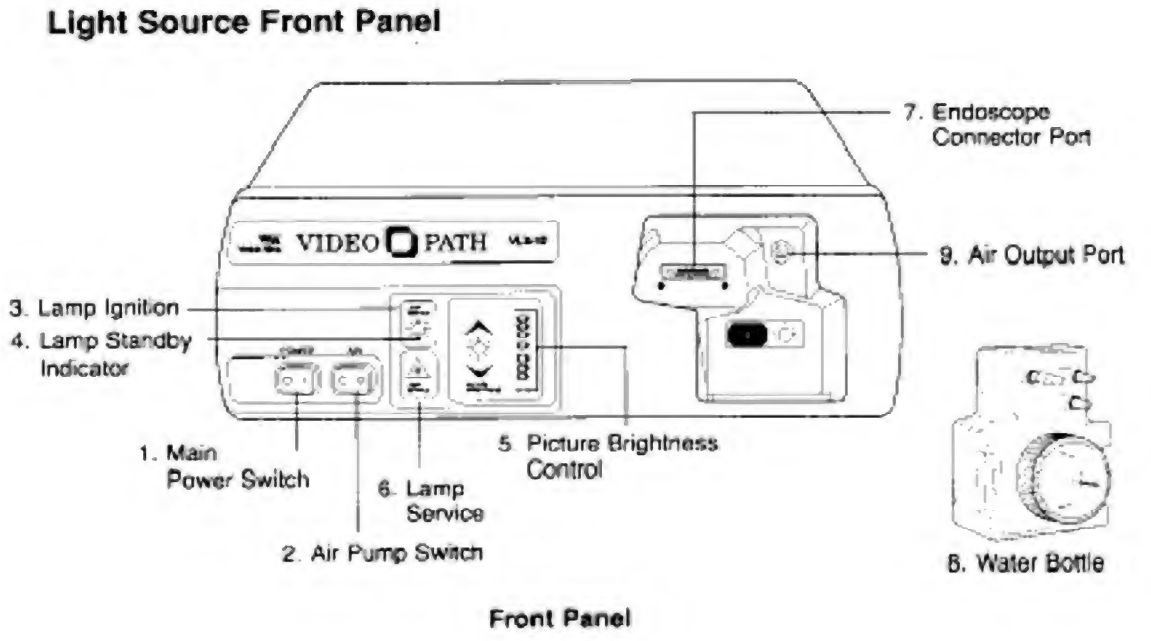


Figure 1-1: Light Box Panels, Front and Rear

Specifications

Power Requirements

Voltage 115VAC
Frequency 50/60Hz
Current . . . . . 2.0 Amps Max

Dimensions

HxWxD 7x17x16.5 (18x43x42cm)
Weight 15.0lbs (6.8kg)

Operating Environment

Ambient temperature . . . . . +10°C (50°F) to +40°C (104°F)
Atmospheric Pressure . . . . . 700hPa to 1060 hPa

Video Outputs

Y/C S-Video Type,
Composite BNC Type, 1.0 V p-p 75 Ohms
RGB 9 Pin Type

Communications

RS232 Type Communications Port

Illumination

Lamp Type . . . . . Metal Hallide Arc
Lamp Life (Average) . . . . . 750 Hrs @ 1 Hr per start
Brightness Adjustment . . . . . Automatic Shutter
Cooling Method . . . . . Forced Air

Air Feeding

Pump Type . . . . . Free Piston, Linear Motor
Capacity . . . . . 6.5 PSIG Max.
Flow rate . . . . . .177c.f.m. @ 2.84 PSIG
Control . . . . . Power switch activated

Water Feed System

Water Compression . . . . . Pressurized by pumped air
Water Bottle Capacity 260ml

Compatible Endoscopes

Welch Allyn Video Endoscopes . . . . . Color CCD Only
Other Manufacturer's Fiber Scopes . . . . . All with Video Adaptor

Specifications (Continued)

Compliance

Designed in Accordance Degree of explosive proofing . . . . . UL 2601
Use in potentially flammable surroundings prohibited

Classification

Electro medical equipment . . . . . Class 2, sprong plug
Degree of protection against electric shock . . . . . Type B

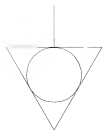
Fuse T2.0A-250V

Lamp

Lamp Voltage 60V
Welch Allyn PN 04060

SYSTEM SYMBOL DESCRIPTIONS

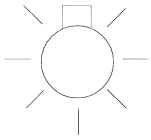
Attention. Read Operating Manual for Warnings, Precautions, and Instructions for Use.



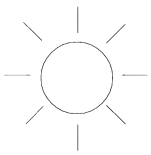
Potential Equalization Stud

Type BF Equipment

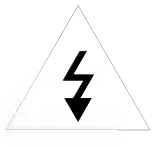
Warning: Risk of Fire. Replace Fuses as Marked.



Lamp Standby



Picture Brightness



Dangerous Voltage

Section

2

Service

Intent of Manual

The purpose of this manual is to provide Welch Allyn Inc. authorized service representatives with systematic guidelines for preventative maintenance, problem identification, and service of the VideoPath VLX-10/20 Light Source. We have included the theory of operation schematic diagrams, simplified drawings, service tips and procedures to assist a trained service representative with board-level repairs. Should you encounter problems that are beyond the scope of this manual, please contact the Technical Service Department of Welch Allyn's Medical Products for assistance.

Required Tools for Service

Medium flatblade screwdriver (1/4")

#1 and #2 Phillips head screwdrivers

.050 hex key

1/16 hex key

5/64 hex key

3/32 hex key

5/32 hex key

Adjustable wrench (1/2" - 13mm jaw width)

Electronic cutters

Needle nose pliers

5/16" nut driver

Soldering iron

Heat sink compound

Antistatic Workstation

DVM/Milli-ohmeter, Fluke model 77 or equivalent

Oscilloscope, TV triggering

Calibrated, NTSC or PAL video monitor preferably Medical grade, SONY PVM1350 or Equivalent

Slotted Screw Driver WA P/N T13958

Words of Caution

High Voltage

Use caution when servicing a VideoPath Video Sigmoidoscope system. When servicing the unit, potentially dangerous high voltage levels are exposed. Disconnect the power cord whenever possible to avoid electric shock.

Static Electricity (ESD)

Adhere to standard ESD practices at all times when servicing this equipment. Many of the electronic devices in this equipment are static sensitive, and may suffer catastrophic or latent failure if handled improperly.

Heat

Lamps, power supplies, and heat sinks may emit extreme amounts of heat during and after operation. Approach and handle these and other potentially hot components with caution.

Finished Parts

Handle all finished parts with care. The finish can be easily scratched or damaged from poor or improper handling.

When removing an assembly, pay attention to the wire and connector positions in order to facilitate prompt reassembly.

Performance Checks

The following performance checks will help you (1) determine whether or not the system is operating properly, and (2) isolates a problem, if there is one.

System Set Up

Make sure the system is connected as follows:

1. Be sure that power is being provided by the wall outlet. Plug the power cord into the back of the light source, and plug in the monitor.

2. Plug the Video Sigmoidoscope into the light source (make certain it is inserted completely).

3. Make certain the monitor is functioning properly. This may involve connecting a different scope or VCR through the same composite, S-video, or RGB connector.

4. Connect the S-video, RGB, and composite video cables as necessary between the light source and the tested video monitor.

5. Plug the endoscope connector terminal into light source's connector port. Insert the water bottle into recessed area of the connector port. Activate the power switch on the front panel. The green ignition/standby light will blink for approximately 11 seconds. Once the ignition/standby light stops blinking and remains lit, press the lamp ignition switch. The lamps will ignite, the ignition/standby light will go out, and the center picture brightness control LED will blink for another approximate 11 seconds (This is the warm-up phase for the lamps). After the approximate 11 seconds, the lamp will reach full intensity, the picture brightness control LED will remain lit, and the system will be ready for use.

6. A high quality video image should be displayed on the monitor.

Note: If the light source is powered up without the endoscope plugged in, the lamps will **not** illuminate and the standby LED will continually blink. No other activity will take place.

If any of these conditions do not occur, see the troubleshooting section.

Manual Mode Test

1. With power to the light source off, depress both picture brightness buttons while simultaneously applying power to the unit.

2. After 11 seconds, the lamps should ignite and all of the picture brightness control LED's should blink. This should occur for another 11 seconds after which the lamps will reach full intensity and the picture brightness control LED's will remain lit.

3. You can now manually adjust the lamp brightness (Light vane motor adjustment) up or down using the picture brightness control buttons.

Testing The Light Source

1. Verify that the light source functions in manual mode per the procedure described above.

2. After verifying manual mode functionality, turn off the light source.

3. Insert the camera/module into the light source.

4. Activate the power switch on the front panel. The green ignition/standby light will blink for approximately 11 seconds. Once the ignition/standby light stops blinking and remains lit, press the lamp ignition switch. The lamps will ignite, the ignition/standby light will go out, and the center picture brightness control LED will blink for another approximate 11 seconds (This is the warm-up phase for the lamps). After the approximate 11 seconds, the lamp will reach full intensity, the picture brightness control LED will remain lit, and the system will be ready for use.

5. Check the video outputs on the back of the light source by connecting a composite or S-video cable to the proper output terminal. With distal end of the scope focused on a functional viewing scene (ie: cupped hand) view monitor for a quality picture.

Calibrations

Not Applicable

Section

3

Problem Solving

Troubleshooting

Experience shows that many service calls are due to improper operator technique and poor connections. Before taking apart the VLX-10/20, make sure that setup errors are not causing the problem. **When checking voltages or signals, be sure to verify signal through the harness wires, connectors, and on the circuit board.** Reference numbers in parentheses, such as (A5), refer to the Interconnect Diagram located in APPENDIX A.

Symptom	Possible Cause	Procedure
Lamps do not illuminate.	No power to unit	Check power cord and verify proper connection. Check and verify fuses. Verify power to switching power supply.
	Lamp connector is out of place. Lamp is blown.	Verify lamp door is in place and lamp door safety switch is activated and functioning properly. Remove lamp door and re-seat connector.
	Defective ballast	Verify unit functions with a known good lamp or lamp functions with a known good unit. Verify voltage outputs at PS1 and PS2 of Ballast Board (A7 & A8). Verify voltage inputs at J1 and J2 (A & B) of Ballast Board (A7 & A8). Verify voltage outputs at Switching Power Supply (A1) and Light Control Board (A3).
Lamp service LED is on, image is good, lamp is illuminated.	Lamp is near end of life.	Replace lamp.
	Defective ballast board (A7/A8)	Verify voltage on pin 2 of J1A and J1B of ballast board (A7/A8). It should measure 12V with service LED off and 0V with LED on. Replace ballast if defective.
	Defective or out of calibration ballast board (A7/A8)	Using a known good lamp or a 151.5Ω, +20W resistor, verify proper DC output voltage across the lamp (**Measure voltage only after lamp start-up routine is complete to avoid damaging meter!**). A good ballast board (using 151.5Ω resistor) will measure 55VDC across P1 & P2. Note that the lamp failure light (with a good Ballast board) will actuate when a lamps voltage reaches 66.8VDC or greater (An indication of potential lamp failure).

Refer to Interconnect Diagram

Symptom	Possible Cause	Procedure
Color drift, poor color, or no color.	Monitor settings are incorrect or biased.	Reset all monitor settings to their mid-range. Test monitor with another source or test source with another monitor.
	Lamp is near end of service life.	Observe the color of light exiting the probe. A blue or purple tint indicates end of lamp life. Replace lamp.
	Defective or misadjusted board set on probe.	Verify with test probe.
	SVHS chrominance or illuminance cable is defective or broken.	Replace SVHS Cable.

Symptom	Possible Cause	Procedure
Pump does not function or no air available, power is available as indicated by lamp ignition and image availability.	Defective wire harness or pump switch.	Verify voltage from rear panel to switch to the pump.
	Defective pump.	Verify and replace as necessary.
	Air line clogged or disconnected.	Verify and correct as necessary.
	Clogged or defective scope module.	Verify and correct as necessary. Consult User Manual or factory if unable to correct.

Refer to Interconnect Diagram

Symptom	Possible Cause	Procedure
No image, Lamp Ignition LED not illuminated, lamp not illuminated, fan does not function (No power is apparent).	Power line damaged or disconnected.	Connect, repair, or replace as necessary.
	Power is not turned "ON"	Turn power on.
	Lamp Door Interlock Interlock switch is disengaged.	Verify that lamp replacement door is firmly and properly in place and that interlock switch is functioning properly. Listen carefully for two clicks as the interlock switch is engaged.
	AC line fuses F1 and/or F2 are open.	Verify and replace as necessary.
	Open circuit connection.	Verify AC input through unit to the Switching Power Supply (A1).
	Power supply circuit defective.	Verify DC output at J2 of Switching Power Supply (A1).
	Other circuits loading down power supply.	If fuse is blown, disconnect P2 from the Switching Power Supply (A1), replace blown fuse, and reapply power. Verify DC output at J2. If not present or fuse is again blown, replace Switching Power supply (A1).

Refer to Interconnect Diagram

Symptom	Possible Cause	Procedure
No image, Lamp Ignition LED is illuminated, lamp is illuminated.	Improper system setup	Verify setup and adjust where necessary (See Operating Manual).
	Failed system component.	Disconnect, isolate remove, and replace defective system component.
	Endoscope connector has not been fully inserted.	Turn off power switch, reinsert Endoscope and turn power switch on.
	Endoscope is defective.	Verify using test or known good Endoscope
	Damaged hypertronics connector on light source.	Inspect, disassemble and replace as necessary.
	Dislodged or defective internal connections.	Verify proper seating and signals for both input and output sides of Light Control/Video Output Board (A3), (A5).
	Defective Light Control/Output Board (A3).	Verify signal voltages at J2 of Light ControlVideo Output Board (A3), (A5). Remove and replace as necessary.
	Defective DC to DC Converter Power Supply (A2)	Verify output voltages at J202 of DC to DC Converter Power Supply (A2) and input voltages at J7 and J9 of Light Control Board (A3).

Refer to Interconnect Diagram

Symptom	Possible Cause	Procedure
Poor or unusable image.	Defective SVHS Cable	Verify and replace as necessary.
	Improper monitor settings.	Verify and set to nominal as necessary.
	Broken, dirty, or smudged imager window on Endoscope.	Visually inspect and clean as necessary. and replace as necessary If broken, consult factory for service.
	Insufficient light output.	Verify lamp output. Inspect fiber bundles at distal end of scope. Consult factory if fibers are noticeably broken.
	Defective Endoscope.	Verify with a known good Endoscope.
	Damaged Hypertronics Connector.	Inspect and replace as necessary.
Excessive video interference.	Insufficient ground.	Verify proper light source grounds. Inspect Hypertronics connector and ribbon connectors. Replace as necessary.
	Defective Endoscope.	Verify with a known good Endoscope.

Refer to Interconnect Diagram

Symptom	Possible Cause	Procedure
Poor illumination response or excessive blooming.	Picture brightness control on light source set at maximum (Top) position.	Change brightness control to a lower setting.
	Defective Endoscope or Light Control Board (A3).	Increase target distance. Verify signal voltages at J1 of Light Control Board (A3).
	Defective Attenuator Assembly.	Remove cover, place light source in manual mode, verify full articulation of light vane. Correct mechanical failure or replace motor as necessary.
Intermittent or no manual light control.	Defective Light Control Board (A3).	Verify proper signal voltages and replace as necessary.
	Defective Endoscope.	Verify with a test probe.
	Defective or misaligned internal connections.	Visually inspect internal connectors on Light Control Board (A3) and between Light Control Board (A3) and Light attenuator Assembly. Lightly tap internal connections while observing image on monitor.
	Defective Attenuator Assembly.	Verify light vane articulation and proper motor function. Replace as necessary.

Refer to Interconnect Diagram

Symptom	Possible Cause	Procedure
Freeze frame, copy, or toggle not functioning.	Improper system setup.	Verify setup and adjust where necessary.
	Failed system component (Scope, printer, light source, cables, etc).	Disconnect, isolate, remove, and replace system component as necessary.
	Defective RS232 control board.	Verify serial data transmission input at pin 2 of connector P1 on the RS232 control board. replace board as necessary.
	Misaligned, defective, or damaged interconnect.	Verify proper connections between light control board and RS232 board (W040) and hypertronics connector and light control board (Flex ckt).
		Verify condition of hypertronics connector (Pin 9) for broken or bent pins. Replace as necessary.
	Defective scope.	Verify by replacing with a known good scope.

PINOUTS

Use the following tables during troubleshooting to help locate signals.

Power Supply Board (A1)

Connector	Pin	Name	Description
J1	3&5	LINE	AC input power
	1	GND	Ground
J2	1-4	+15V	+15V supply out
	5-9	GND	Ground
	11&13	SENSE	Output voltage sense

Video Output Connectors VLX-10

Connector	Pin	Name	Description
405050 #14	1	CVO	Composite video out
	2	GND	ground
405050 #13	1-2	GND	ground
	3	Y-VID	Y-video signal out
	4	C-VID	C-video signal out

Video Output Connectors VLX-20

Connector	Pin	Name	Description
J1	1	SYNC	RGB Sync output
	2	BL	RGB Blue output
	3	GRN	RGB Green output
	4	RED	RGB Red output
	5-9	GND	RGB Ground
J2/J3	1-2	GND	ground
	3	Y-VID	Y-video signal out
	4	C-VID	C-video signal out
J4/J6	1	CVO	Composite video out
	2	GND	ground

Refer to Interconnect Diagram

Light Control Board (A3)

Connector	Pin	Name	Description
J1 Flex circuit to Camera Module	1	AUX1	RGB Sync (VLX-20)
	2	AUX2	RGB Blue (VLX-20)
	3	AUX3	RGB Green (VLX-20)
	4	AUX4	RGB Red (VLX-20)
	5	-C	C-video signal out
	6	-Y	Y-video signal out
	7	V-GND	ground
	8	CVO	Composite video out
	9	OPT1	Option data line
	10	+7.4V	not used
	11	GND	ground
	12	-12V	-12V
	13	+5V	+5V
	14	+8.5V	not used
	15	+12V	+12V
	16	+15V	+15V
	17	IRIS	Scope sense line
J2	1	nc	
	2	GND	ground
	3	CVO	Composite video
	4	GND	ground
	5	AUX1	RGB Sync (VLX-20)
	6	GND	ground
	7	AUX2	RGB Blue (VLX-20)
	8	GND	ground
	9	AUX3	RGB Green (VLX-20)
	10	GND	ground
	11	AUX4	RGB Red (VLX-20)
	12	GND	ground
	13	C-VID	C-video signal in
	14	GND	ground
	15	Y-VID	Y-video signal in
	16	GND	ground
J5	1	1 RETURN	Ballast ground (A7)
	2	2 RETURN	Ballast ground (A8)
J6	1	GND	ground (from A1)
	2	GND	ground (from A1)
J7 Power from A2	1	+15V	+15V
	2	+12V	+12V
	3	+8.5V	+8.5V
	4	+5V	+5V
	5	GND	ground
	6	-12V	-12V
J9 Power from A2	1	+12V	+12V
	2	+8.5V	+8.5V
	3	GND	ground
	4	-12V	-12V
	5	+7.4V	+7.4V
J11	1	+5	+5V
	2	RDI	Receive data in (Serial image capture data from scope).
	3	GND	Ground

DC-DC converter power supply Board (A2)

Connector	Pin	Name	Description
J201	1	+15V	+15V (from A1)
	2	GND	ground
J202	1	-12V	-12V
	3	-12V	-12V
	7	GND	ground
	9	GND	ground
	13	+12V	+12V
	15	+12V	+12V
	19	+5V	+5V
	25	+8.5V	+8.5V
	26	+8.5V	+8.5V
	27	+7.4V	+7.4V
	29	+15V	+15V

Ballast (A7)

Connector	Pin	Name	Description
J1A	1	+V	
	2	Service	
J2A	1	+15V	+15V from Power Supply (A1)
		note: Inductor L between (A1) and (A7)	
	2	GND	ground

Ballast (A8)

Connector	Pin	Name	Description
J1B	1	+V	
	2	Service	
J2B	1	+15V	+15V from Power Supply (A1)
		note: Inductor L between (A1) and (A8)	
	2	GND	ground

Refer to Interconnect Diagram

RS232 Control Board

Connector	Pin	Name	Description
J1	1	+5	+5V
	2	RDI	Receive Data In (Serial image capture data from scope).
	3	GND	Ground
J2			
	2	TD	Transmit data
	3	RD	Receive data
	4	RTS	Request to send
	5	CTS	Clear to send
	6	DSR	Data set ready
	7	GND	Ground
	8	DCD	Carrier Detect
	10	OUTB	Output B
	11	OUTD	Output D
	12	OUTF	Output F
	20	DTR	Data terminal ready
	22	RI	Ring indicator
	23	OUTC	Output C
	24	OUTE	Output E
	25	OUTG	Output G

Refer to Interconnect Diagram

Section

4 Disassembly and Repair

About This Section

This section describes how to remove and replace major sub assemblies and components of the VideoPath VLX-10/20 Light Source.

Note: Drawings numbers with a 0 in the second digit (ie 405059) may refer to the VLX-10 Light Source. Drawings numbers with a 5 in the second digit (ie 455059) may refer to the VLX-20 Light Source. This section defaults to the VLX-10 Light Source drawing numbers when describing the disassembly and repair in detail. Refer to the appropriate drawing as necessary when servicing the VLX-10 or VLX-20.

Remove and Replace Pump Assembly (405050 #4)

1. Remove top cover (405000 #10) by removing 4 cover screws (405000 #2). Be sure to be careful not to lose the back panel gasket (405000 #9).

2. Remove the 2 pump brackets (405050 #24) by removing the 4 screws (405050 #33).

3. Using a small screw driver, free the pump assembly (405050 #4) from the base (405050 #1) by carefully freeing the 4 rubber bumpers securing the pump asm to the base.

4. Remove the tubing and red (+15V) and black (ground) wires from the pump and replace.
   A. Be sure to note the location of the red and black wires when removing (Black wire (#2 on pump) is in the up position and the red wire (#1 on pump) is in the down position).
   B. Carefully pull the 4 rubber bumpers back through the base using a needle nose pliers.

5. Reassemble in reverse order noting to replace the back panel gasket (405000 #9) properly.

Remove and Replace the Light Control Board Asm (405015 #2)

1. Remove top cover (405000 #10) by removing 4 cover screws (405000 #2). Be sure to be careful not to lose the back panel gasket (405000 #9).

2. Free the front panel assembly (405018 #2) from the base (405050 #1) as follows:
   A. Remove the 4 screws and washers (405018 #3, 4, & 5) securing the front panes assembly (405018 #2) to the base (405018 #1).
   B. Cut the 2 wire ties (405050 #50) securing the wire harnesses from the light control board to the base.
   C. Disconnect each wire harness from the light control board (405015 #2).
   D. Remove ground wire from side of heat sink assembly (405015 #3) and let dangle.
   E. Remove air tube from connector on front panel assembly (405018 #2).
   F. Gently slide the front panel forward and away from the base.

3. Remove the light control board by removing the four screws (405015 #14), and the wire harnesses (Note location for reassembly).

4. Reassemble in reverse order noting the location of the wire harnesses using interconnect diagram 405059. Torque all hardware per appropriate drawing.

Remove and Replace an IR Filter (455220 #5)

1. Remove top cover (405000 #10) by removing 4 cover screws (405000 #2). Be sure to be careful not to lose the back panel gasket (405000 #9).

2. Remove the lamp assembly.

3. Free the front panel assembly (405018 #2) from the base (405050 #1) as follows:
   A. Remove the 4 screws and washers (405018 #3, 4, &5) securing the front panes assembly (405018 #2) to the base (405018 #1).
   B. Cut the 2 wire ties (405050 #50) securing the wire harnesses from the light control board to the base.
   C. Disconnect each wire harness from the light control board (405015 #2).
   D. Remove ground wire from side of heat sink assembly (405015 #3) and let dangle.
   E. Remove air tube from connector on front panel assembly (405018 #2).
   F. Gently slide the front panel forward and away from the base.

4. Remove the two Hex Head screws (405015 #11) securing the light attenuator assembly (405015 #4) to the heat sink assembly (405015 #3).

5. Carefully, without disturbing the light vane or motor, clear away any excess glass or epoxy left in the channel where the IR filter resides. Using a clear Master Bond Epoxy, secure the new IR filter in place with the coated side up. You can identify the coated side of the IR filter by placing the filter on a sheet of clean white paper. While looking down through the filter at the edge, it should appear cyan (green/blue). If it appears white, flip it over, it is coated side down. Cure in an oven at 50° C for 1.5 hours or at room temperature for 12 hours.

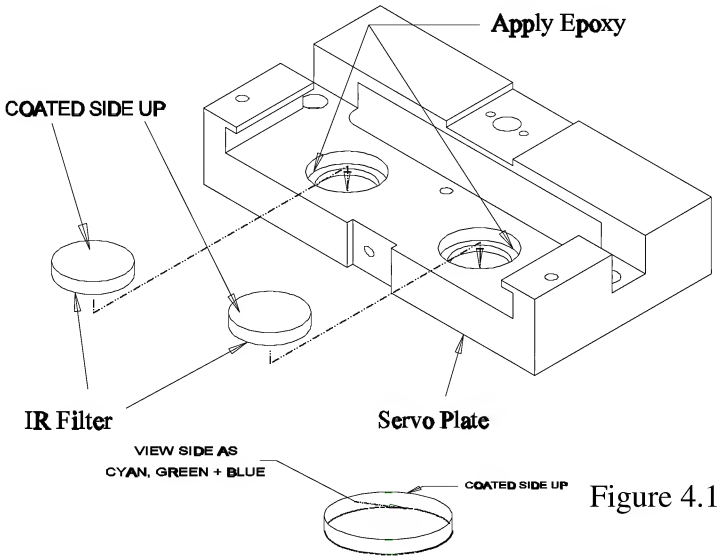


Figure 4.1

6. Reassemble in reverse order. Torque the two Hex Head screws (405015 #11) per drawing 405015.

Figure 4.2

Remove and Replace the Hypertronics Assembly (405013 #5)

1. Remove top cover (405000 #10) by removing 4 cover screws (405000 #2). Be sure to be careful not to lose the back panel gasket (405000 #9).

2. Remove the lamp assembly.

3. Free the front panel assembly (405018 #2) from the base (405050 #1) as follows:
   A. Remove the 4 screws and washers (405018 #3, 4, &5) securing the front panes assembly (405018 #2) to the base (405018 #1).
   B. Cut the 2 wire ties (405050 #50) securing the wire harnesses from the light control board to the base.
   C. Disconnect each wire harness from the light control board (405015 #2).
   D. Remove ground wire from side of heat sink assembly (405015 #3) and let dangle.
   E. Remove air tube from connector on front panel assembly (405018 #2).
   F. Gently slide the front panel forward and away from the base.

4. Remove the two Hex Head screws (405015 #11) securing the light attenuator assembly (405015 #4) to the heat sink assembly (405015 #3).

5. Separate the flex ckt [part of hypertronics asm (405013 #5)] from the flat clamps (405015 #13), disconnect from the light control bd (#2), and remove heat sink assembly.

6. Using slotted screw driver T13958, remove the hypertronics screws and remove the hypertronics assembly (405013 #5).

7. Reassemble the new hypertronics connector to the heat sink per illustration noting the position of the of the connector pins and the position of the hypertronics screws. Torque per drawing 405013.

8. Reassemble in reverse order. Note torque specs per drawings 405015 and 405013.

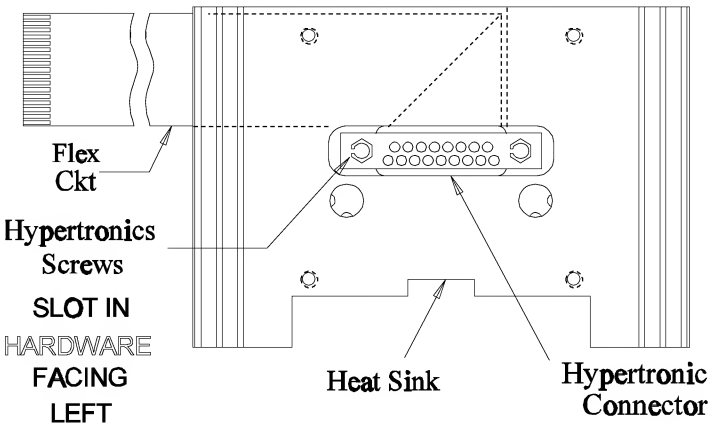


Figure 4.3

Removal of the Gearhead Motor (455220 #1)

1. Remove top cover (405000 #10) by removing 4 cover screws (405000 #2). Be sure to be careful not to lose the back panel gasket (405000 #9).

2. Remove the lamp assembly.

3. Free the front panel assembly (405018 #2) from the base (405050 #1) as follows:
   A. Remove the 4 screws and washers (405018 #3, 4, &5) securing the front panes assembly (405018 #2) to the base (405018 #1).
   B. Cut the 2 wire ties (405050 #50) securing the wire harnesses from the light control board to the base.
   C. Disconnect each wire harness from the light control board (405015 #2).
   D. Remove ground wire from side of heat sink assembly (405015 #3) and let dangle.
   E. Remove air tube from connector on front panel assembly (405018 #2).
   F. Gently slide the front panel forward and away from the base.

4. Remove the two Hex Head screws (405015 #11) securing the light attenuator assembly (405015 #4) to the heat sink assembly (405015 #3).

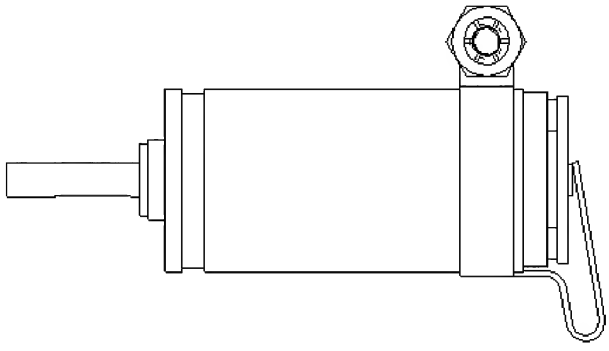
5. Separate the light vane (455220 #2) and light control spring (455220 #6) from the light attenuator assembly be loosening the set screw securing the light vane to the motor shaft. Set both aside for reassembly.

6. Remove the motor clip (455220 #7) by loosening the nut and screw securing it to the motor and set aside for reassembly.

7. Remove the motor by removing the two screws securing it to the servo plate (455220 #4).

8. Reassemble the light attenuator assembly as follows:

A. Acquire a new motor (455220 #7) and reassemble the motor clip (455220 #7).



Gearhead Motor Figure 4.4

B. Reassemble the motor to the servo plate noting the general direction of the motor in relation with thte servo plate.

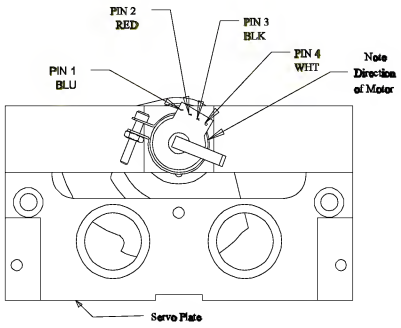


Figure 4.5

C. Using a smooth sided pair of needle nose pliers, adjust the shaft to the motor assembly so the flat side is up (See figure 4.6)

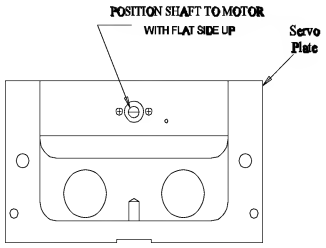
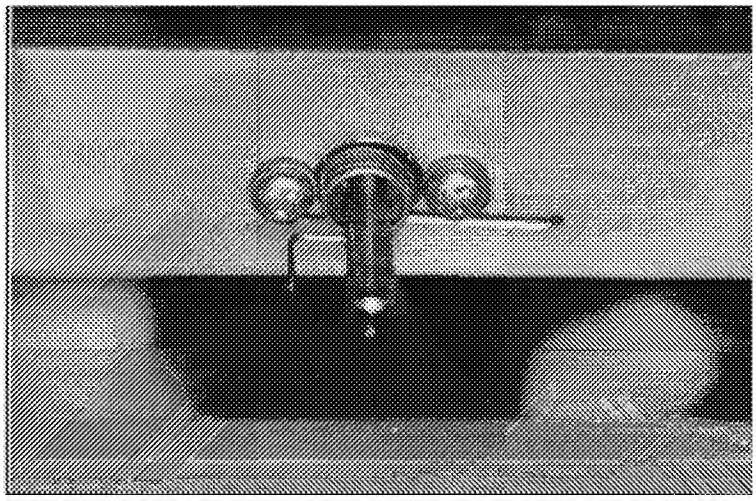


Figure 4.6

D. Reassemble the light control spring (455220 #6) onto the shaft of the motor assembly per illustration.

E. Position light vane and servo hub assembly and assemble onto shaft of motor assembly. Place out-standing pin from light control spring into small pin hole in the back of servo hub (455220 #4). Carefully spin light vane and servo hub assembly with light control spring clockwise until slot in light vane is positioned over the dowel pin. Carefully push the light vane and servo hub assembly down while inserting the dowel pin slightly into the light vane slot. Using fixture WT-2574 to set a proper distance, secure the light vane and servo hub assembly to the motor shaft by tightening the set screw in the pre-positioned set screw hole. remove and set aside fixture.



Position of Spring

Figure 4.7

9. Reassemble light attenuator assembly and light source in reverse order. Torque the two Hex Head screws (405015 #11) to 24 IN. LBS.

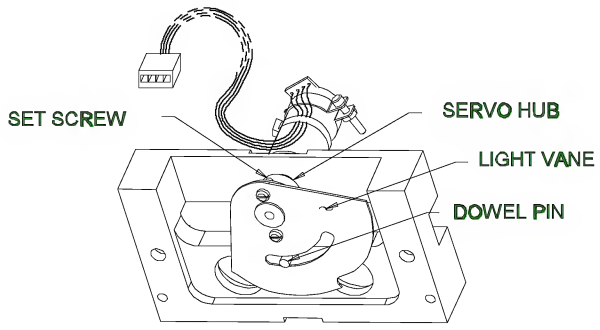


Figure 4.8

Remove and Replace a Ballast Board (455400 #3)

1. Remove top cover (405000 #10) by removing 4 cover screws (405000 #2). Be sure to be careful not to lose the back panel gasket (405000 #9).

2. Identify the ballast board (455400 #3) in need of replacement, and remove the 4 screws securing it to the ballast board bracket assembly (405050 #2).

3. Disconnect the light control and switching power supply harnesses from the ballast board.

4. Lift up the ballast board and carefully desolder the lamp connector.

5. Reassemble in reverse order noting the proper location of the lamp harness to the ballast board and to be careful when reinstalling the ballast as they can strip out the insulated ballast plate (455400 #2).

Remove and Replace 80W Condor Power Supply (405050 #5 (A1))

1. Remove top cover (405000 #10) by removing 4 cover screws (405000 #2). Be sure to be careful not to lose the back panel gasket (405000 #9).

2. Remove the 4 screws (405050 #34) securing the power supply (405050 #5) to the base (405050 #1).

3. Remove the input and output wire harnesses and replace.

4. Reassemble in reverse order. Note torque specs per appropriate drawing.

Remove and Replace DC-DC Power Supply (405050 #6 (A3))

1. Remove top cover (405000 #10) by removing 4 cover screws (405000 #2). Be sure to be careful not to lose the back panel gasket (405000 #9).

2. Remove the 4 screws (405050 #31) securing the power supply (405050 #6) to the base (405050 #1).

3. Remove the input and output wire harnesses and replace.

4. Reassemble in reverse order. Note torque specs per appropriate drawing.

Section

5 Maintenance

Preventative Maintenance

The purpose of preventative maintenance is to pro-actively reduce or eliminate future problems. Keeping the VideoPath VLX-10/20 Light Source in good operating condition ensures that it will perform reliably and safely. Every six to twelve months, you should:

* check all video and power cables for wear.

* ensure that, during use, the VLX-10/20 receives adequate ventilation.

* vacuum the VLX-10/20 for any excessive dust.

* check VS-100/200 umbilical for wear or damage.

* check fiber optics for wear.

In addition, it is recommend that regular cleaning of the optical and illumination paths be performed. Using a soft cloth and alcohol clean these areas:

-fiber optics on both ends of the VS-100/200
-camera window on VS-100/200

Visual Inspection

Check for anything out of the ordinary in all of the components of the VLX-10/20 and VS-100/200 For instance:

- Are any of the video or power cables showing signs of age (cracking or fraying)?

- Does the VLX-10/20 make too much noise?

- Are there any loose parts inside the box?

- Do all switches work properly?

- Do all components connect/disconnect easily?

CLEANING

Refer to Operating Manual, Welch Allyn Part Number 405071.

Check Ground Impedance

1. Disconnect the power cord from the VLX-10/20.

2. Connect an ohmmeter (measuring at milli-ohms) between ground terminal of the appliance inlet receptacle and the outside of the Composite Video Output (BNC) connector on the rear panel.

3. Ensure that the ground impedance is less than 0.1 ohms.

Measuring Leakage Current

To check the VLX-10/20 Chassis Leakage Current:

1. Connect the VLX-10/20 to a leakage tester (refer to figure 5-1), and measure leakage current on leakage meter. Ensure that leakage is less than 100 microamperes.

2. Open ground line, and ensure leakage current is less than 100 microamperes.

3. Reverse line polarity, and ensure that leakage current is less than 100 microamperes.

4. With reversed polarity, open ground line and ensure leakage is less than 100 microamperes.

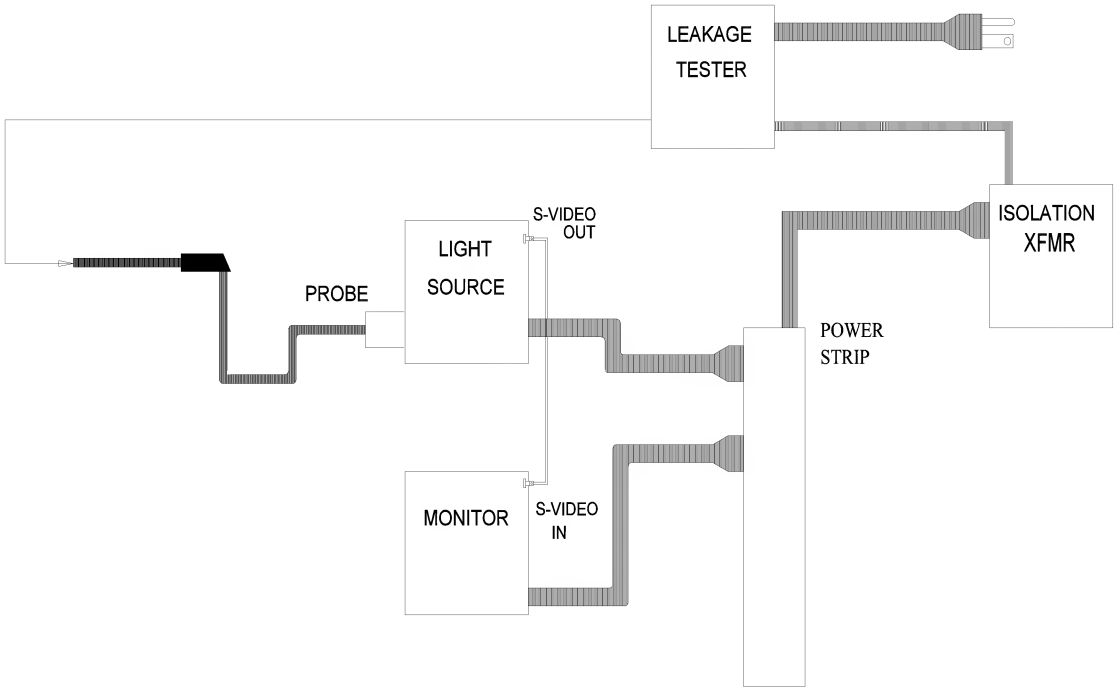
Always use a high quality meter capable of testing to AAMI specifications.

CAUTION: The meter must be suitably insulated and capable of withstanding the power line voltage.

LEAKAGE CURRENT TEST SET-UP

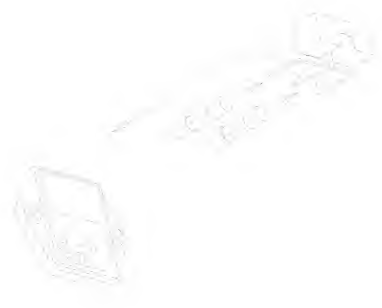
When the VideoPath camera system is used in conjunction with other video accessories, it may be necessary to measure the leakage current level of the entire set-up. A typical system setup is shown in Figure 5-1. Using a standard leakage tester, this set-up will allow the overall system leakage current to be measured. If this value exceeds 100 microamps (or whatever the maximum requirements are for a particular region), an isolation transformer should be used.

Figure 5-1: Typical Current Leakage Test Set-Up



FUSE REPLACEMENT

1. Turn the power switch OFF and disconnect the power cord from the light source.
2. Open fuse drawer located as part of the power cord receptacle.
3. Remove fuse by pulling it out firmly.
4. Check fuse condition. Replace if blown. Replacement fuse: 250V, 2.0 Amps. 5 x 20mm , Fast Blow
5. This system has two fuses. Be certain to check the condition of both fuses.



Fuse Replacement Figure 5-2

LAMP REPLACEMENT

Refer to users manual.

1. Turn the power switch OFF and disconnect the power cord from the light source.
2. Wait a minimum of 5 minutes to allow the lamp to cool.
3. Open the lamp door on the bottom of the Light Source by unscrewing the two screws.

   NOTE: Opening door will automatically cut off power to the Light Source.
4. Slide black connector's off the lamps.
5. Unscrew lamp assembly and slide it out of the Light Source.
6. Acquire new replacement lamp assembly.
7. Secure lamp assembly in place, tighten screw.
8. Slide black connector on to lamp.
9. Secure lamp door.
10. Reconnect system to verify lamp operation and power interlock switch is closed.

Section 6

Theory of Operation

Introduction

The VLX-10/20 provides a light source, power supply, and video pass through route for the VS-100/200 Video sigmoidoscope. The major sub-components of the VLX-10/20 are: Power Supply, DC to DC Converter, Video Output Board/Light Control Board, and Ballast. This section describes these boards. Refer to Figure 1-1 in Section 1 for the functional block diagram.

Start up Routine (Lamp Ignition)

VS-100/200 INSERTED - Upon turning on the power switch lamp standby LED blinks for approximately 11 seconds. After the 11 seconds has elapsed, the lamp standby light ceases to blink and stays lit. Pressing the lamp ignition switch will ignite the lamps for an approximate warm-up phase of 11 seconds. During this interval. the lamp standby LED will turn off and the center picture brightness LED will blink. Once this warm-up phase is complete, the picture brightness LED will remain lit, the lamps will be warmed up, and the system will be ready for use.

VLX-10/20 ALONE (No Scope) - Upon turning on the power switch the standby LED will continue to blink. No other activity will take place until a scope is inserted into the connector port.

Power Supply

UNIVERSAL INPUT, SWITCHING AC TO DC MEDICAL GRADE POWER SUPPLY

The power supply accepts an input voltage of 100-240 VAC, 50-60 Hz, single phase. The primary circuit provides adequate control of leakage current, which is limited to 35 microamperes maximum. The primary side of the power supply rectifies the AC voltage and converts it to a high voltage DC level. This DC voltage is connected to the isolation transformer through a switching device, typically a mosfet. The mosfet is triggered by a high frequency clock circuit, typically at a 30-50 KHz rate. The secondary side of this transformer provides isolation between primary and secondary circuits. The secondary voltage is rectified and filtered to provide a +15 VDC output voltage at 5.3 amps. The output voltage is regulated to 2%, with peak-to-peak noise of 150mV. The output is fully protected against short circuit and output overload. Short circuit protection is a cycling type power limit with automatic recovery after fault.

DC to DC Converter

The DC to DC converter generates 6 different DC voltage levels from an input of 15 VDC received from the power supply.

Circuit Description:
+15 VDC is routed into the board through J201. This voltage is routed to 5 voltage regulators either directly or through transformer T1. Regulator U1 provides +12V and is output through J202, pins 13 - 18. Regulator U2 provides +8.5V and is output through J202, pins 25 & 26. Regulator U3 provides +15V and is output through J202, pins 29 & 30. Regulator U4 provides -12V and is output through J202, pins 1 - 4. Regulator U5 provides +5V and is output through J202, pins 19 - 24. +7.4V is derived off of leg 5 of T1 and is output through J202, pins 27 & 28.

Light Control Board

The Light Control Board turns the lamp on and off and sets camera exposure levels according to the users preference.

Circuit Description:
The major component on the board is the microcontroller U1. The microcontroller provides a user interface to the system. It performs the following functions:

- controls lamp starts and shut-offs
- lights LEDs which indicate lamp standby and exposure level
- reads momentary push buttons
- detects scope insertion and communicates with a similar microcontroller in the handpiece.
- acts as the video interface between the sigmoidoscope and the external monitoring device.

The microcontroller controls the lamp by emitting either +5V or 0V at port C bit 0 (pin 22). When the micro places 0V on pin 22 mosfet Q1 conducts and effectively creates a short between connectors J5 and J6. This provides the ground path needed to power the ballast and fire the lamp. When +5V is placed on pin 22 the mosfet Q1 does not conduct and the ground path to the ballast is opened thereby turning the lamp off.

LEDs mounted on this board serve as feedback to the user on several different system functions. D1 - D7 (controlled by port A bits 0 - 6, pins 10 - 4) indicate the selected exposure level. Only one of these LEDs is illuminated at any one time. Also the illuminated LED may blink indicating that the system is in a warm-up mode. D10 is lit whenever the lamp is off and is controlled by port C bit 0 (pin 22).

There are three momentary push buttons. S2 is connected to port B bit 6 (pin 12) and allows the user to turn the lamp on and off. S1 and S3 are connected to port B bits 5 and 7 (pins 11 and 13) respectively. They allow the user to increase and the camera exposure and are active whenever the sigmoidoscope is inserted.

Light Control Board (Continued)

When the sigmoidoscope is inserted in the VLX-10/20, the op-amp U3A detects the resultant voltage present on pin 17 of J1 and outputs 0V which is connected to port D bit 7 (pin 25) of the microcontroller. This informs the microcontroller of the handpiece's presence.

The microcontroller communicates with a similar microcontroller mounted inside the scope through the OPT1 line (port C bit 1, pin 21). Signals are sent to indicate if the lamp is on or off, and also what the selected user preference for exposure is.

The light control board also serves as a pass through for power to and video signals from the sigmoidoscope.

The video output portion provides the interface for the video signals between the scope interface and external video devices (monitors, printers, etc.). Composite Video, Y (luminance) and C (chrominance), and RGB signals are fed into the board via a ribbon coax cable through J1. The board provides outputs for Composite, S-video (SVHS), and RGB. S-Video is the combination of Y and C signals.

Ballast Board

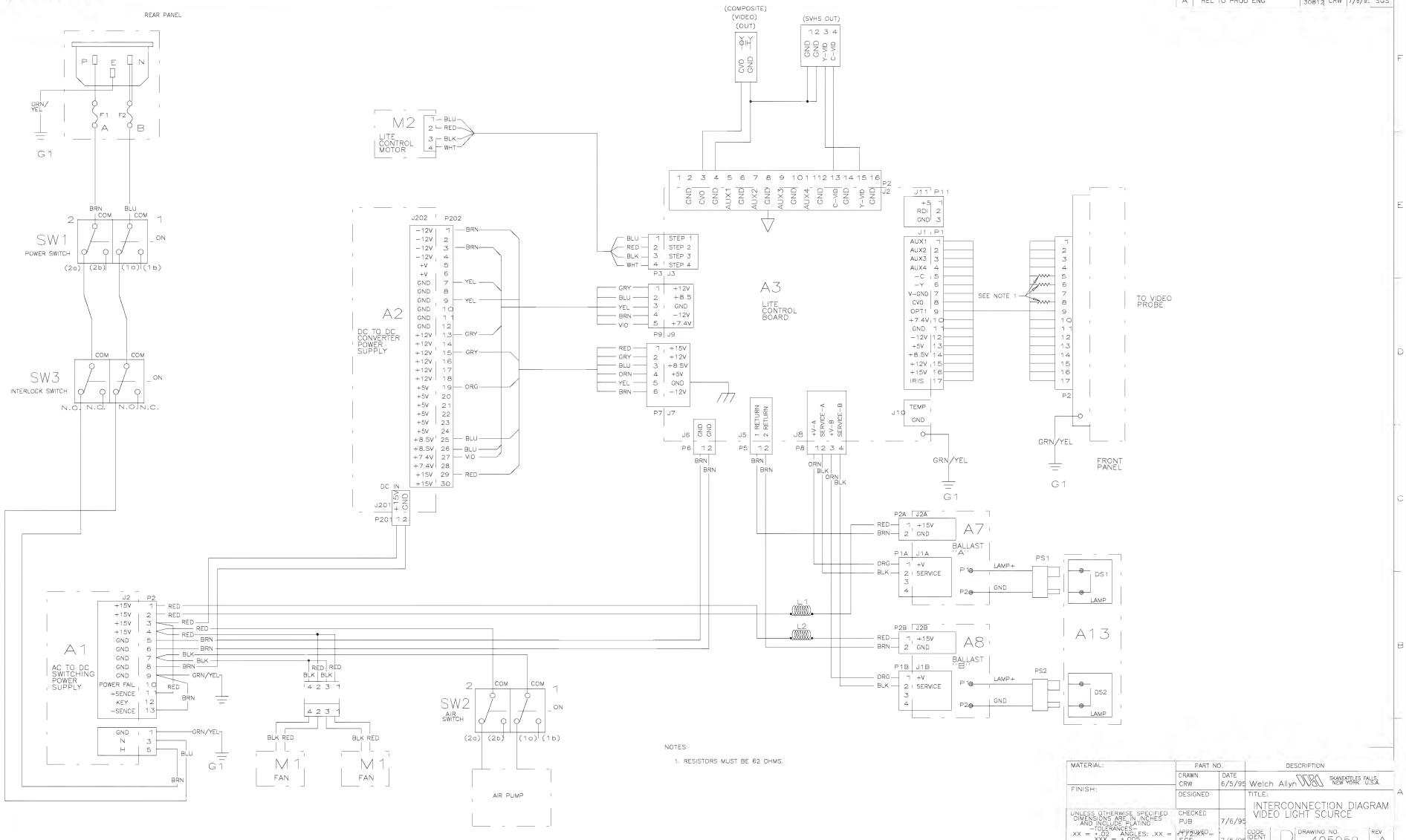
The ballast boards are a power supply used to operate the 21 watt Welch Allyn miniature arc lamps. The nature of arc lamps require a ballast which limits the current, and therefore the power, in the lamp. There are three states of the operation of the ballast: ignition, warm-up, and steady state. In ignition the ballast provides the lamp with a train of ignition pulses between 6 and 7 kV. Once the lamp is ignited the ballast conducts current at a very low impedance, which constitutes the warm-up phase. Once it warms up, the impedance changes to a higher steady state value.

VLX-10 PARENT ASSEMBLY NUMBER	VLX-10 DRAWING NUMBER	VLX-20 PARENT ASSEMBLY NUMBER	VLX-20 DRAWING NUMBER	REF DES	INTER CONNECT	DESCRIPTION	PART NUMBER	QTY	REC. INV.
405000-501N	405000	455000-501N	455000	2		COVER SCREWS	451565-1	4	10
405000-501N	405000	455000-501N	455000	3		LIGHT CONTROL PANEL LABEL	455503	1	1
405000-501N	405000	455000-501N	455000	4		CAUTION STICKER	405104-1	1	1
405000-501N	405000	455000-501N	455000	8	A13	LAMP ASSY	455219	1	5
405000-501N	405000	455000-501N	455000	9		BACK PANEL GASKET	455325	1	1
405000-501N	405000	455000-501N	455000	10		COVER	455555	1	1
405018-501N	405018	455018-501N	455018	2		FRONT PANEL ASM	405015-501N	1	0
405018-501N	405018	455018-501N	455018	3		SPLIT RING WASHER	106105-4	4	2
405018-501N	405018	455018-501N	455018	4		FLAT WASHER	106103-24	4	2
405018-501N	405018	455018-501N	455018	5		FRONT PANEL SCREW	106119-19	4	2
405050-501N	405050	455050-501N	455050	1		BASE	405002	1	0
405011-501N	405011	405011-501N	405011	1		PUMP	405004	1	1
405050-501N	405050	455050-501N	455050	3		FUSE	488307-8	2	10
405050-501N	405050	455050-501N	455050	4	AIR PUMP	PUMP ASM	405011-501N	1	0
405050-501N	405050	455050-501N	455050	5	A1	80W CONDOR POWER SUPPLY	455431	1	1
405050-501N	405050	455050-501N	455050	6	A2	DC-DC POWER SUPPLY	455432	1	1
405050-501N	405050	455050-501N	455050	7	SW2	AIR SWITCH	455402	1	2
405050-501N	405050	455050-501N	455050	8	M1	FAN ASSY	455245	1	1
405050-501N	405050	455050-501N	455050	9		IEC CONNECTOR	236732	1	1
405050-501N	405050	455050-501N	455050	10		FUSE DRAWER	236733	1	1
405050-501N	405050	455050-501N	455050	12		FEET	455608	4	4
405050-501N	405050			13		WIRE HARNESS, SVHS	405056	1	1
405050-501N	405050			14		WIRE HARNESS, BNC (COMPOSITE)	405055	1	1
405050-501N	405050	455050-501N	455050	18	SW1	POWER SWITCH	455401	1	2
405050-501N	405050	455050-501N	455050	21		WIRE HARNESS, DC-DC LCB	455247	1	1
		455050-501N	455050	22		WIRE HARNESS, SECONDARY	455057-501N	1	1
405050-501N	405050			22		WIRE HARNESS, SECONDARY	405057-501	1	1
405050-501N	405050	455050-501N	455050	23		WIRE HARNESS, PRIMARY	405058-501	1	1
405050-501N	405050	455050-501N	455050	24		PUMP BRACKET	405021	2	0
405050-501N	405050	455050-501N	455050	31		SCREW, INTERNAL WASHER	106140-4	4	0
405050-501N	405050	455050-501N	455050	33		SCREW, INTERNAL WASHER	106140-5	8	0
405050-501N	405050	455050-501N	455050	34		SCREW, INTERNAL WASHER	106140-6	4	0
405050-501N	405050	455050-501N	455050	50		WIRE TIE	405010	8	50
405050-501N	405050			57		BACK PANEL LABEL	405109-2	1	1
		455050-501N	455050	57		BACK PANEL LABEL	455514	1	1
405050-501N	405050	455050-501N	455050	58		CABLE CLIP	405016	3	2
		455050-501N	455050	60		RS232 CONTROL BOARD ASM	455015-501	1	1
		455050-501N	455050	67	A5	OUTPUT BOARD ASM	455016-501	1	1
455235-501N	455235	455235-501N	455235	2		LIGHT CONTROL BOARD	455236	1	1
405015-501N	405015	405015-501N	405015	2	A3	LIGHT CONTROL BOARD ASM	455235-501N	1	0
405015-501N	405015	405015-501N	405015	3		HEAT SINK ASSEMBLY	405013-501N	1	0
405015-501N	405015	405015-501N	405015	4		LIGHT ATTENUATOR ASSEMBLY	455220-502	1	0
405015-501N	405015	405015-501N	405015	11		LIGHTATTENUATOR ALLEN SCREW	106119-20	2	2
405015-501N	405015	405015-501N	405015	12		8-32 ALLEN SCREWS	106119-18	4	2
405015-501N	405015	405015-501N	405015	13		FLAT CLAMPS	455324	3	2
405015-501N	405015	405015-501N	405015	14		#4 PLASTIC SCREW	106124-21	4	2
405015-501N	405015	405015-501N	405015	16		FERRITE BEAD	405017	1	1
455220-501	455220	455220-501	455220	1	M2	GEARHEAD MOTOR	DH7966	1	1
455220-501	455220	455220-501	455220	2		LIGHT VANE	D807392	1	0
455220-501	455220	455220-501	455220	3		SERVO HUB	DH7762	1	0
455220-501	455220	455220-501	455220	4		SERVO PLATE	DH7761	1	0
455220-501	455220	455220-501	455220	5		IR FILTER	DH713	2	2
455220-501	455220	455220-501	455220	6		LIGHT CONTROL SPRING	DH8370	1	1
455220-501	455220	455220-501	455220	7		MOTOR CLIP	D808327	1	1
405013-501N	405013	405013-501N	405013	2		HYPERTRONICS WASHERS	106103-23	2	2
405013-501N	405013	405013-501N	405013	3		BALL PLUNGER	455323	4	2
405013-501N	405013	405013-501N	405013	5		HYPERTRONICS/FLEX CKT ASSEMBL	455433-1	1	2
455400-503	455400	455400-503	455400	2		INSULATED BALLAST PLATE	DH9575	1	1
455400-503	455400	455400-503	455400	3	A7/A8	BALLAST BOARD	D43205119-01	2	5
455400-503	455400	455400-503	455400	4		DOUBLE POLE MICRO SWITCH	DH7676	1	1
40500 REPAIR	N/A	45500 REPAIR	N/A	N/A		SERVICE MANUAL, LIGHT BOX	455007	1	1
40500	N/A	45500	N/A	N/A		USERS MANUAL, LIGHT BOX	405071	1	1
40500	N/A	40500	N/A	N/A		POWER CORD	761076-1	1	1
40500	N/A	40500	N/A	N/A		CLEANING BOTTLE ASSY	455299-501N	1	1
40500	N/A	40500	N/A	N/A		WATER BOTTLE ASSY	455298-501N	1	1
40500	N/A	40500	N/A	N/A		SVHS VIDEO CABLE	455020	1	1

Part numbers with a "D" are vendor (Imaging) part numbers with the "D" as a prefix.

D 405059 A THESE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF WELCH ALLYN, INC. AND SHALL NOT BE REPRODUCED, OR COPIED, OR USED AS A BASIS FOR MANUFACTURE OR SALE OF EQUIPMENT OR DEVICES WITHOUT WRITTEN PERMISSION.

REV	DESCRIPTION	ECN	INIT	DATE	APPR
A	REL TO PROD ENG	S-30812	CRW	7/6/95	SGS



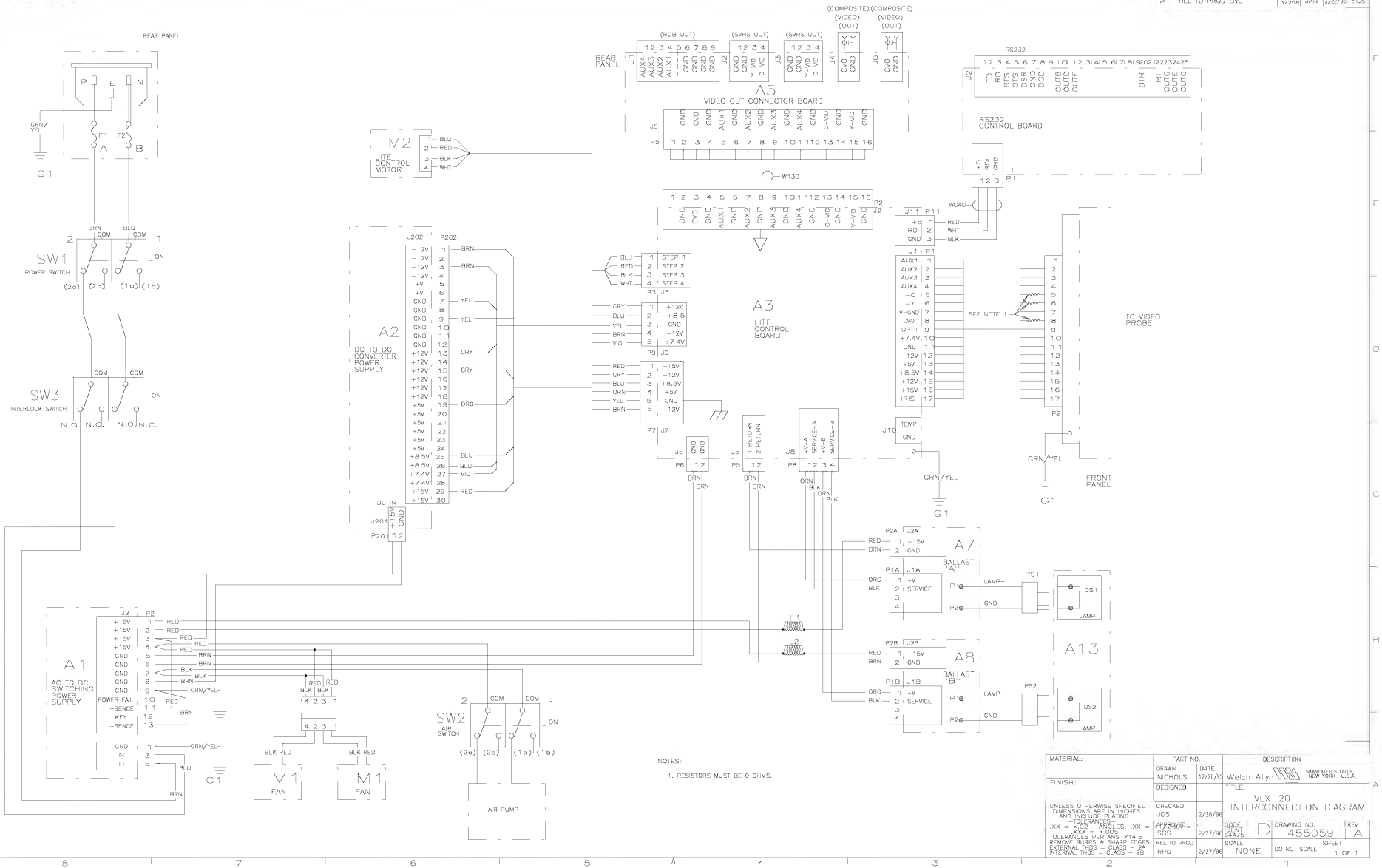
NOTES:

1. RESISTORS MUST BE 62 OHMS.

MATERIAL:	PART NO.	DESCRIPTION
FINISH:	DRAWN CRW 6/5/95	Welch Allyn SKANEATELES FALLS, NEW YORK U.S.A.
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES AND INCLUDE PLATING TOLERANCES: .XX = ±.02 ANGLES: .XX = XXX = ±.010 TOLERANCING PER ANSI Y14.5 REMOVE BURRS & SHARP EDGES EXTERNAL THDS = CLASS – 2A INTERNAL THDS = CLASS – 2B	DESIGNED	TITLE: INTERCONNECTION DIAGRAM VIDEO LIGHT SOURCE
	CHECKED PJB 7/6/95	
	APPROVED SGS 7/6/95	CODE IDENT. 64475 DRAWING NO. D 405059 REV A
	REL TO PROD RPD 7/7/95	SCALE NONE DO NOT SCALE SHEET 1 OF 1

D 455059 A THESE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF WELCH ALLYN, INC. AND SHALL NOT BE REPRODUCED, OR COPIED, OR USED AS A BASIS FOR MANUFACTURE OR SALE OF EQUIPMENT OR DEVICES WITHOUT WRITTEN PERMISSION

REV	DESCRIPTION	ECN	INIT	DATE	APPR
A	REL TO PROD ENG	S 32258	JAN	2/22/96	SGS



NOTES:

1. RESISTORS MUST BE 0 OHMS.

MATERIAL:	PART NO.	DESCRIPTION
FINISH:	DRAWN NICHOLS 12/26/95	Welch Allyn SKANEATELES FALLS, NEW YORK U.S.A.
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES AND INCLUDE PLATING. TOLERANCES: .XX = ±.02 ANGLES: .XX = ±.005 .XXX = ±.005 TOLERANCES PER ANSI Y14.5 REMOVE BURRS & SHARP EDGES EXTERNAL THDS = CLASS - 2A INTERNAL THDS = CLASS - 2B	DESIGNED	TITLE: VLX-20 INTERCONNECTION DIAGRAM
	CHECKED JGS 2/26/96	
	APPROVED SGS 2/27/96	CODE IDENT 64425 DRAWING NO. D 455059 REV A
	REL TO PROD RPD 2/27/96	SCALE NONE DO NOT SCALE SHEET 1 OF 1

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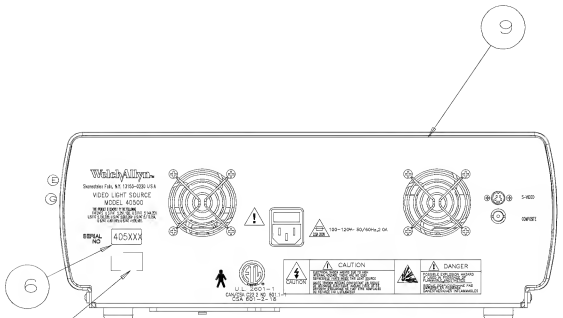
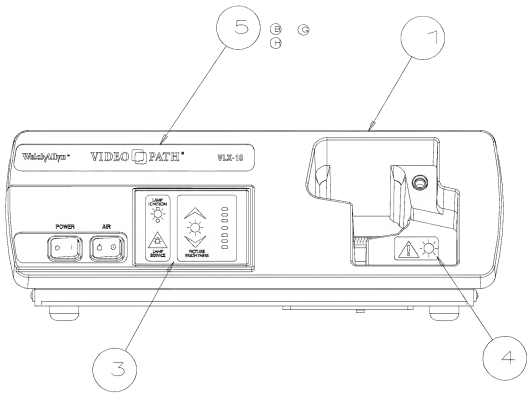
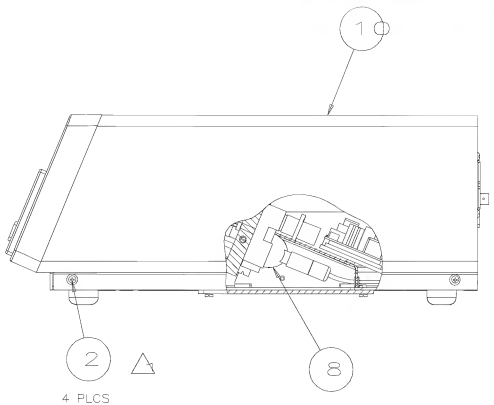
REV	DESCRIPTION	ECN	INIT	DATE	APPR
A	RELEASE TO PRODUCTION	S-30782	JAN	6/20/95	SGS
B	SEE ECN	S-31239	JAN	9/23/95	PJB
C	ADDED SPECIFICATIONS 3 THRU 7	S-31579	JAN	11/8/95	PJB
D	NOTE 3 1800VAC FOR 1 SEC WAS 3000VAC FOR 1 MIN	S-32066	JAN	2/7/96	PJB
E	REV'D PATENT INFORMATION	S-32333	JAN	3/5/96	SGS
F	REV'D NOTE 5	S-32789	JAN	6/2/96	SGS
G	UPDATED GRAPHICS ON LABELS	S-33062	JAN	7/16/96	PJB
H	DISPLAYED NEW LABEL (ITEM 5)	S-34500	CRW	1/24/97	SGS

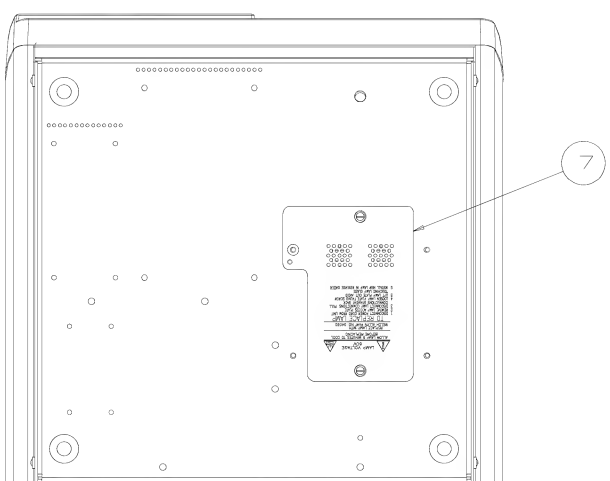


APPROXIMATE LOCATION FOR BAR CODE LABEL

BACK VIEW







NOTES:

1. TORQUE TO 8 ±2 IN LBS.

(B) SPECIFICATIONS:

1. PUMP OUTPUT

   FLOW AT 0 cc/MIN. PRESSURE≤ 7.5 P.S.I.G.
   PRESSURE AT 4 P.S.I.G. FLOW ≥ 1150 cc/MIN.
   PRESSURE AT 2.5 P.S.I.G. FLOW ≥ 2100 cc/MIN.

2. LIGHT OUTPUT

   MINIMUM LIGHT OUTPUT OF 2900 FOOTCANDLES USING:
   LIGHT SOURCE: MODEL 40500
   TEST PLUG: TOOL NUMBER T14002
   LIGHT METER: MAKE: MINOLTA; MODEL: T-1
   3" INTEGRATIMG SPHERE

(G) 3. HI-POT TEST - 1800 VAC, 1 SEC.

(C) 4. LEAKAGE CURRENT AT AIR AND BNC CONNECTORS - 100mV MAX.

(F) 5. GROUND CONTINUITY AT BNC CONNECTOR - 200mV MAX.

6. POT R43 ON POWER SUPPLY BOARD SET TO 15.00 DCV.

7. OTHER TESTS (SEE A03229)
   -BURN IN - 6 HOURS
   -LAMP SERVICE INDICATOR TEST
   -LAMP DOOR INTERRUPT TEST
   -LIGHT CONTROL BOARD TEST
   -AUTOMATIC LIGHT ATTENUATION TEST

THIS DWG-501	LIGHT SOURCE				
PART NO.	DESCRIPTION				
MATERIAL:	DRAWN	DATE	Welch Allyn SKANEATELES FALLS, NEW YORK U.S.A.		
	PJB	5/11/95			
FINISH:	DESIGNED		TITLE:		
			LIGHT SOURCE VLX-10		
	CHECKED				
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES AND INCLUDE PLATING -TOLERANCES- .XX = ±.02 ANGLES: ±1/2 .XXX = ±.005 TOLERANCES PER ANSI Y14.5 REMOVE BURRS & SHARP EDGES EXTERNAL THDS = CLASS - 2A INTERNAL THDS = CLASS - 2B	PJB	6/20/95			
	APPROVED		CODE IDENT	DRAWING NO.	REV
	SGS	6/21/95	04475	D 405000	H
	REL TO PROD		SCALE	DO NOT SCALE	SHEET
	RPD	6/22/95	0.500		1 OF 1

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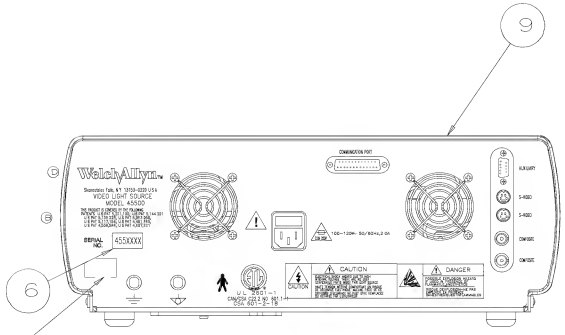
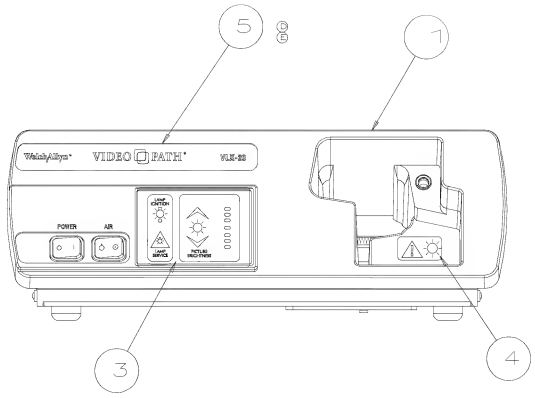
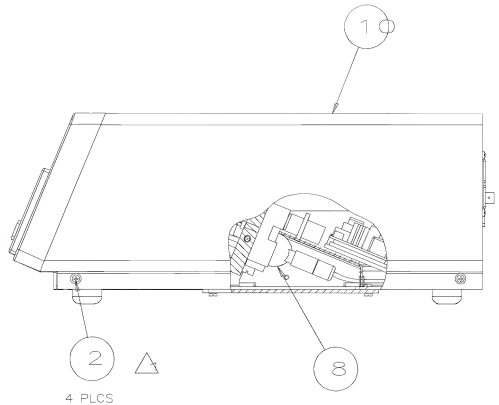
REV	DESCRIPTION	ECN	INIT	DATE	APPR
A	REL TO PROD ENG	32258	JAN	2/24/96	SGS
B	REV'D PATENT INFORMATION	32332	JAN	3/3/96	SGS
C	REV'D NOTE 5	32789	JAN	6/2/96	SGS
D	UPDATED GRAPHICS ON LABELS	33082	JAN	7/15/96	PJB
E	DISPLAYED NEW LABEL (ITEM 5)	34500	CRW	1/24/97	SGS



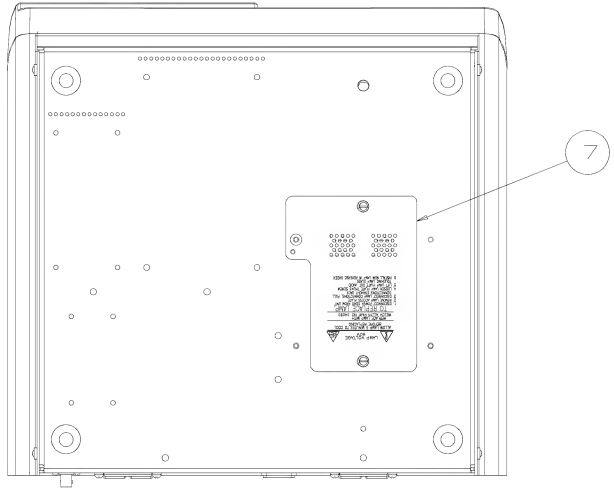
APPROXIMATE LOCATION FOR BAR CODE LABEL

BACK VIEW





4 PLCS



NOTES:

1. TORQUE TO 8 ±2 IN LBS.

SPECIFICATIONS:

1. PUMP OUTPUT

   FLOW AT 0 cc/MIN. PRESSURE≤ 7.5 P.S.I.G.
   PRESSURE AT 4 P.S.I.G. FLOW ≥ 1150 cc/MIN.
   PRESSURE AT 2.5 P.S.I.G. FLOW ≥ 2100 cc/MIN.

2. LIGHT OUTPUT

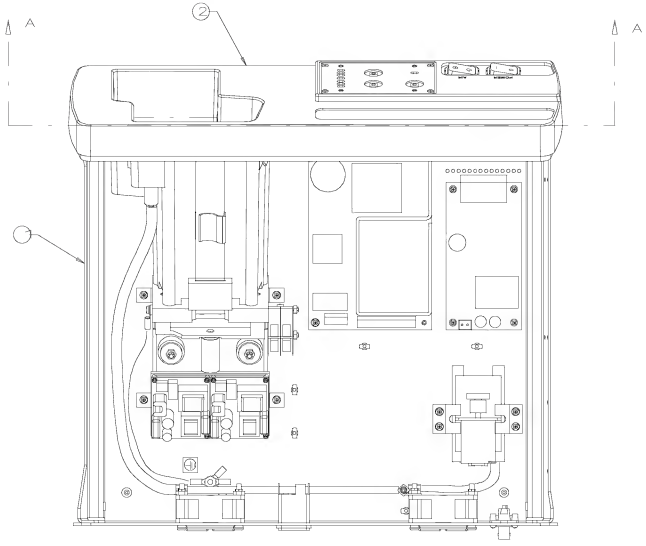
   MINIMUM LIGHT OUTPUT OF 2900 FOOTCANDLES USING:
   LIGHT SOURCE: MODEL 40500
   TEST PLUG: TOOL NUMBER T14002
   LIGHT METER: MAKE: MINOLTA; MODEL: T-1
   3" INTEGRATIMG SPHERE

3. HI-POT TEST – 3000 VAC,1 MIN FOR PRODUCT QUALIFICATION.
   1800 VAC, 1 SEC FOR PRODUCTION QUALITY CONFORMANCE.
4. LEAKAGE CURRENT AT AIR AND BNC CONNECTORS – 100mV MAX.
5. GROUND CONTINUITY AT BNC CONNECTOR – 200mV MAX.
6. POT R43 ON POWER SUPPLY BOARD SET TO 15.00 DCV.
7. OTHER TESTS (SEE A03229)
   -BURN IN – 6 HOURS
   -LAMP SERVICE INDICATOR TEST
   -LAMP DOOR INTERRUPT TEST
   -LIGHT CONTROL BOARD TEST
   -AUTOMATIC LIGHT ATTENUATION TEST
   -RS232 FUNCTIONAL TEST

MATERIAL:	THIS DWG–501	LIGHT SOURCE	
	PART NO.	DESCRIPTION	
FINISH:	DRAWN NICHOLS	DATE 12/19/95	Welch Allyn SKANEATELES FALLS, NEW YORK U.S.A.
	DESIGNED		TITLE: LIGHT SOURCE VLX–20
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES AND INCLUDE PLATING TOLERANCES: .XX = ± .01 ANGLES, .XX = ± .005 TOLERANCES PER ANSI Y14.5 REMOVE BURRS & SHARP EDGES EXTERNAL THDS = CLASS – 2A INTERNAL THDS = CLASS – 2B	CHECKED JGS	2/26/96	
	APPROVED SGS	2/27/96	CODE IDENT 64475 / DRAWING NO. D 455000 / REV E
	REL TO PROD RPD	2/27/96	SCALE 1 : 2 / DO NOT SCALE / SHEET 1 OF 1

405018 B THESE DRAWINGS AND SPECIFICATIONS ARE COPIED, OR USED AS A BASIS FOR MANUFAC THE PROPERTY OF WELCH ALLYN, INC. AND TURE OR SALE OF EQUIPMENT OR DEVICES W SHALL NOT BE REPRODUCED, OR ITHOUT WRITTEN PERMISSION.

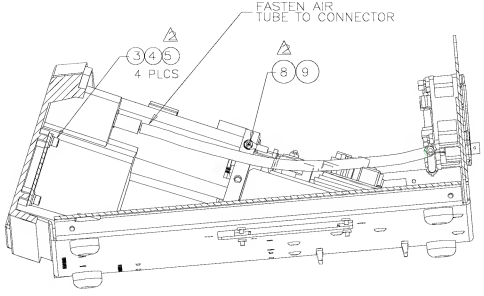
REV	DESCRIPTION	ECN	INIT	DATE	APPR
A	RELEASE TO PRODUCTION	S 30762	JAN	6/20/95	SGS
B	DELETED CALLOUT FOR P/N 10, 2 PLCS	S 32482	JAN	4/2/96	SGS



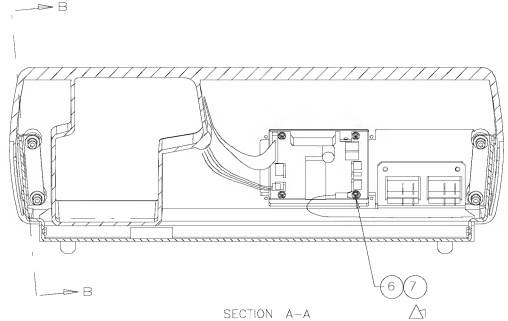
NOTES:

△1 TORQUE TO 6 ±1 IN.LBS.

△2 TORQUE TO 12 ±2 IN.LBS.



SECTION B–B



SECTION A–A

-501	THIS DRAWING			
PART NO.	DESCRIPTION			
MATERIAL:	DRAWN	DATE	Welch Allyn SKANEATELES FALLS, NEW YORK U.S.A.	
	PJB	5/8/95		
FINISH:	DESIGNED		TITLE:	
			ASSEMBLY, FRONT PANEL/ BASE	
	CHECKED			
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES AND INCLUDE PLATING TOLERANCES: .XX = ±.02 ANGLES: ±1/2 .XXX = ±.005 TOLERANCES PER ANSI Y14.5 REMOVE BURRS & SHARP EDGES EXTERNAL THDS = CLASS - 2A INTERNAL THDS = CLASS - 2B	PJB	6/20/95		
	APPROVED		CODE IDENT 64475	DRAWING NO. 405018 REV B
	SGS	6/21/95		
	REL TO PROD		SCALE 0.500 DO NOT SCALE	SHEET 1 OF 1
	RPD	6/22/95		

DI 455018 A
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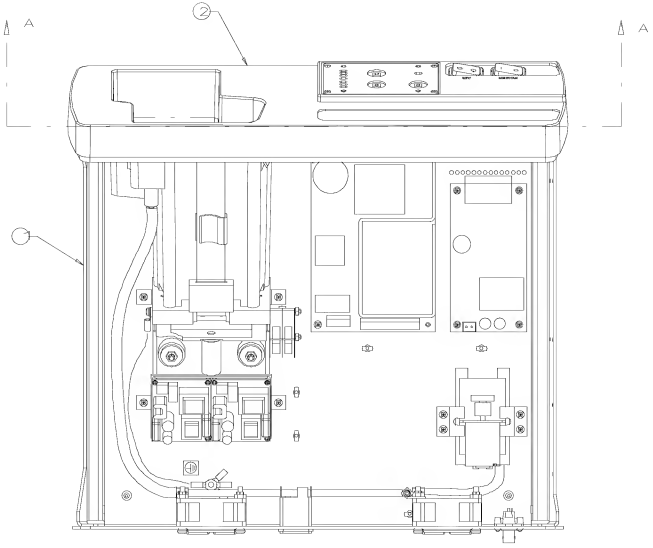
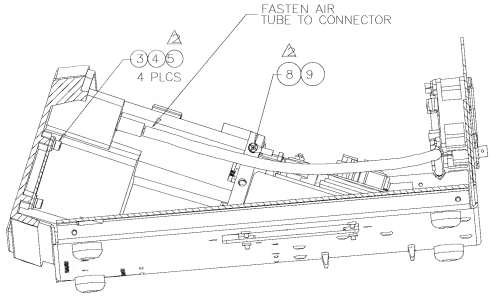
REV	DESCRIPTION	ECN	INIT	DATE	APPR
A	REL TO PROD ENG	S/32258	JAN	2/22/96	SGS



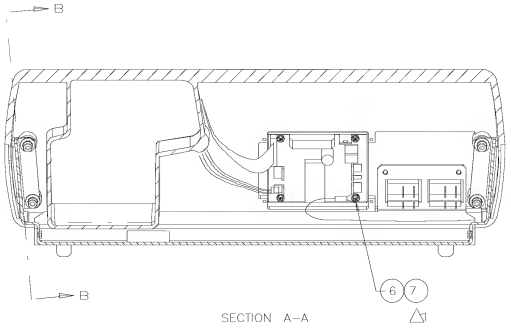
NOTES:

△1 TORQUE TO 6 ±1 IN.LBS.

△2 TORQUE TO 12 ±2 IN.LBS.



SECTION B–B



SECTION A–A

MATERIAL:	THIS DWG–501		FRONT PANEL/BASE, VLX–20	
	PART NO.		DESCRIPTION	
	DRAWN NICHOLS	DATE 12/19/95	Welch Allyn SKANEATELES FALLS, NEW YORK U.S.A.	
FINISH:	DESIGNED		TITLE: ASS'Y, FRONT PANEL/BASE, VLX–20	
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES AND INCLUDE PLATING —TOLERANCES— .XX = ±.02 ANGLES: .XX = ± .XXX = ±.005 TOLERANCES PER ANSI Y14.5 REMOVE BURRS & SHARP EDGES EXTERNAL THDS = CLASS – 2A INTERNAL THDS = CLASS – 2B	CHECKED JGS	2/26/96		
	APPROVED SGS	2/27/96	CODE IDENT. 64475	DRAWING NO. D 455018 REV A
	REL TO PROD RPD	2/27/96	SCALE 1:2	DO NOT SCALE SHEET 1 OF 1

D 405050 G

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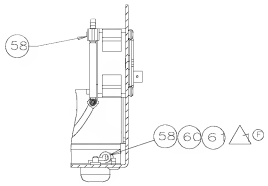
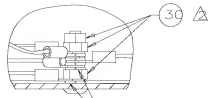
REV	DESCRIPTION	ECN	INIT	CATE	APPR
A	RELEASE TO PRODUCTION	S-30859	JAN	7/11/95	SGS
B	ADDED NOTE 4 & CALLOUT	S-31254	JAN	9/20/95	PJB
C	ADDED ITEM 41	S-31570	JAN	11/6/95	PJB
D	REV'D PATENT INFORMATION	S-32331	JAN	3/5/96	SGS
F	DELETED CALLOUTS FOR P/N 59, 4 PLCS	S-32482	JAN	4/2/96	SGS
F	REVISED DOCUMENTATION OF WIRE TIES & CALLOUTS.SEE ECN	S-32802	JAN	5/22/96	SGS
G	UPDATED GRAPHICS ON LABEL	S-33062	JAN	7/16/96	PJB



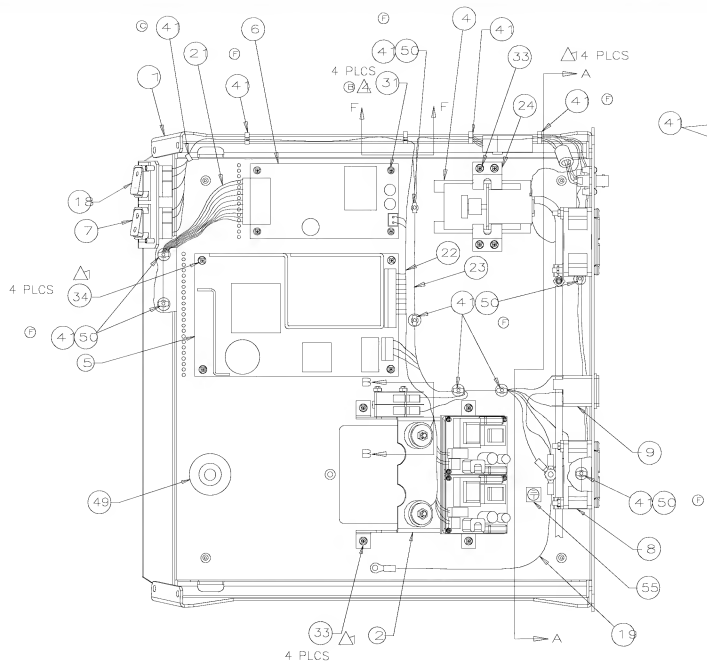
SECTION D-D

SECTION C-C



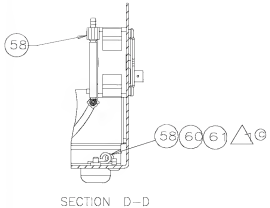
DETAIL E
SCALE 1.000

40 5 REQ'D ONE UNDER EACH RING TERMINAL.


4 PLCS
△4 PLCS
4 PLCS
4 PLCS

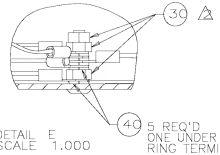
DI 455050 D THESE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF WELCH ALLYN, INC AND SHALL NOT BE REPRODUCED, OR COPIED, OR USED AS A BASIS FOR MANUFACTURE OR SALE OF EQUIPMENT OR DEVICES WITHOUT WRITTEN PERMISSION

REV	DESCRIPTION	ECN	INIT	DATE	APPR	
A	REL TO PROD ENG	S-32258	JAN	2/26/96	SGS	
B	REV'D PATENT INFORMATION	S-32332	JAN	3/5/96	SGS	
C	REVISED DOCUMENTATION OF WIRE TIES & CALLOUTS;ADDED NOTE 5 & SEC FF;SEE ECN	S-32802	JAN	5/22/96	SGS	
D	UPDATED GRAPHICS ON LABELS	S-33082	JAN	7/15/96	PJB	

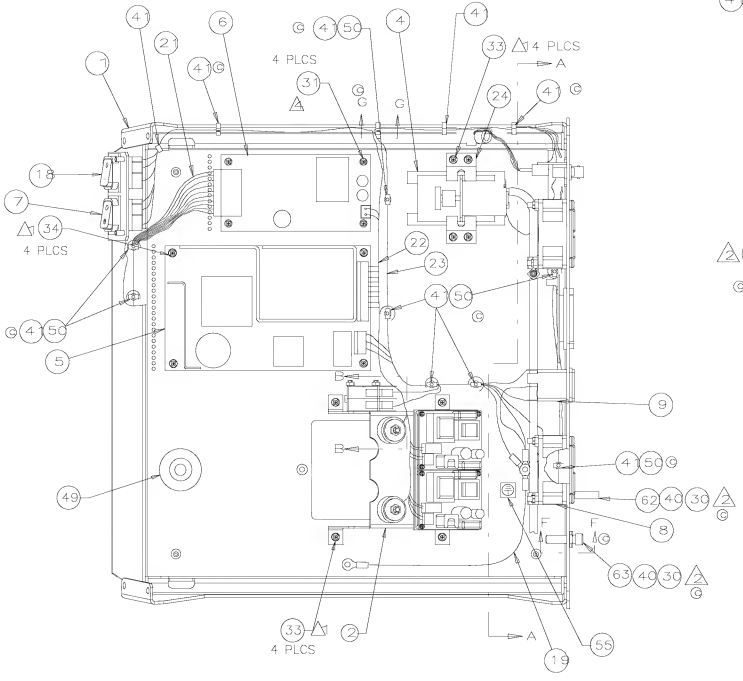


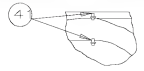
SECTION D–D

SECTION C–C

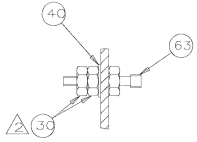


DETAIL E
SCALE 1.000

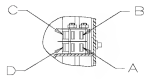




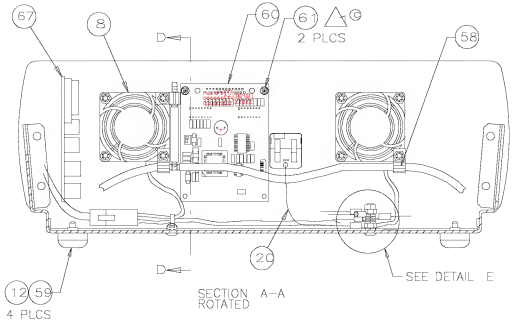
SECTION G–G G



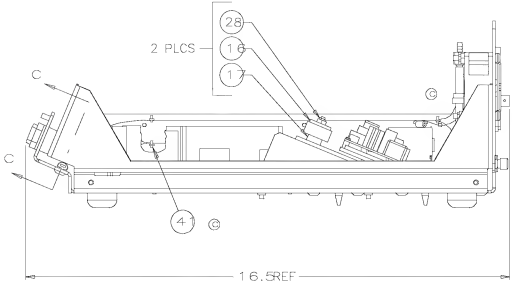
G SECTION F–F △5 REF

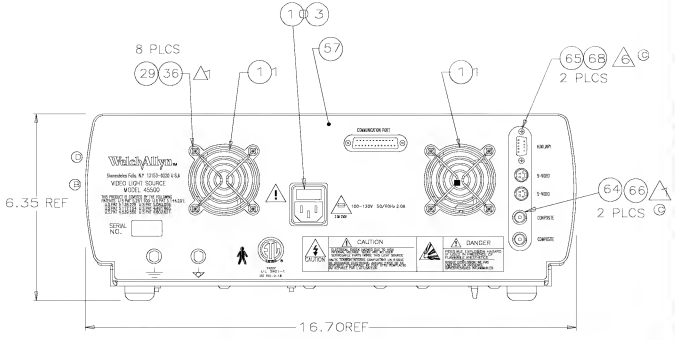


SECTION B–B



SECTION A–A ROTATED





NOTES:

△1 TORQUE TO 10 ±2 IN.LBS.

△2 TORQUE TO 32 ±4 IN.LBS.

△3 TORQUE TO 6 ±1 IN.LBS.

△4 TORQUE TO 5 ±1 IN.LBS.

G △5 ITEMS 62 AND 63 ORIENTED AS SHOWN WITH ITEMS 30 & 40.

THIS DWG–501 BASE ASSEMBLY, VLX–20

	PART NO.	DESCRIPTION
MATERIAL:		
FINISH:		

DRAWN	NICHOLS	DATE 1/10/95
DESIGNED		
CHECKED	JGS	2/26/96
APPROVED	SGS	2/27/96
REL TO PROD	RPD	2/27/96

Welch Allyn SKANEATELES FALLS, NEW YORK U.S.A.

TITLE: BASE ASS'Y VLX–20

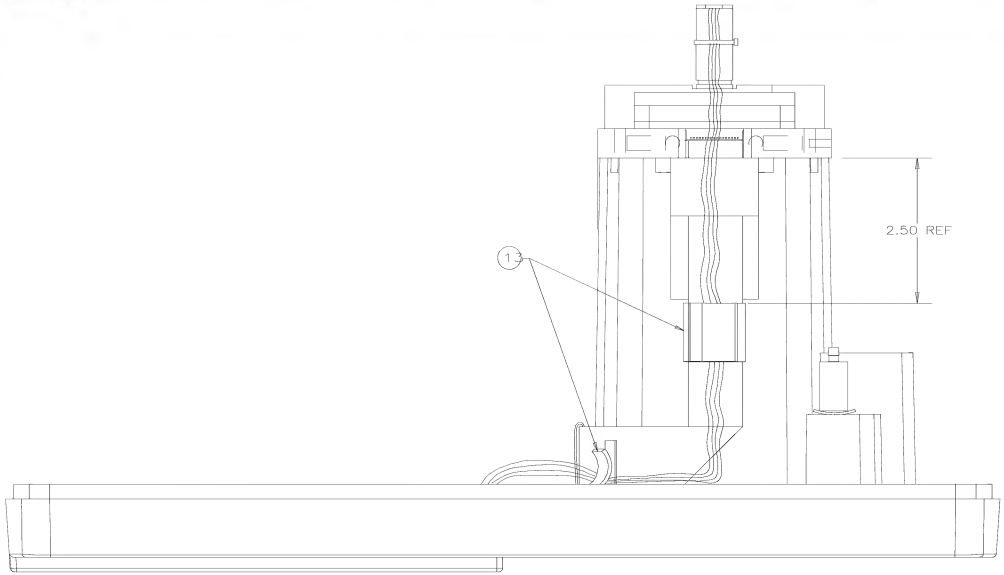
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES AND INCLUDE PLATING
TOLERANCES:
XX = ± .02 ANGLES: XX = ± 2°
XXX = ± .005
TOLERANCES PER ANSI Y14.5
REMOVE BURRS & SHARP EDGES
EXTERNAL THDS = CLASS – 2A
INTERNAL THDS = CLASS – 2B

CODE IDENT 64475 | DRAWING NO. 455050 | REV D

SCALE 1 : 2 | DO NOT SCALE | SHEET 1 OF 1

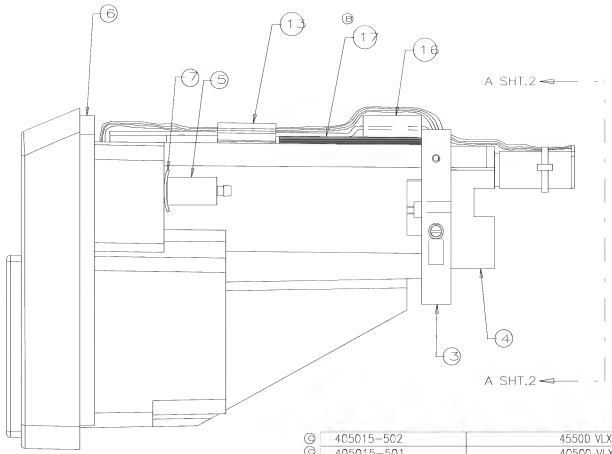
THESE DRAWINGS AND SPECIFICATIONS ARE COPIED, OR USED AS A BASIS FOR MANUFAC THE PROPERTY OF WELCH ALLYN, INC. AND TURE OR SALE OF EQUIPMENT OR DEVICES W SHALL NOT BE REPRODUCED, OR ITHOUT WRITTEN PERMISSION

REV	DESCRIPTION	ECN	INIT	DATE	APPR	
A	RELEASE TO PRODUCTION	S-30762	JAN	6/20/95	SGS	
B	ADD'D TAPE (ITEM 17)	S-30855	CRW	7/11/95	SGS	
C	ADDED -502 & P/N DESCRIPTIONS	S-32348	JAN	3/12/96	JS	



NOTES:

1. TORQUE TO 4 ±1 IN.LBS.
2. TORQUE TO 12 ±2 IN.LBS.
3. TORQUE TO 24 ±3 IN. LBS.



G 405015-502	45500 VLX-20 ASS'Y
G 405015-501	40500 VLX-10 ASS'Y

PART NO.	DESCRIPTION		
MATERIAL:	DRAWN	DATE	Welch Allyn SKANEATELES FALLS, NEW YORK U.S.A.
N/A	PJB	4/3/95	
FINISH:	DESIGNED		TITLE:
N/A			ASSEMBLY, FRONT PANEL.
	CHECKED		
	PJB	6/20/95	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES AND INCLUDE PLATING
—TOLERANCES—
.XX = ±.02 ANGLES: ±1/2°
.XXX = ±.005
TOLERANCES PER ANSI Y14.5
REMOVE BURRS & SHARP EDGES
EXTERNAL THDS = CLASS = 2A
INTERNAL THDS = CLASS = 2B

APPROVED		CODE IDENT	DRAWING NO.	REV
SGS	6/21/95	64475	405015	C
REL TO PROD		SCALE	DO NOT SCALE	SHEET
RPD	6/22/95	1.000		1 OF 2

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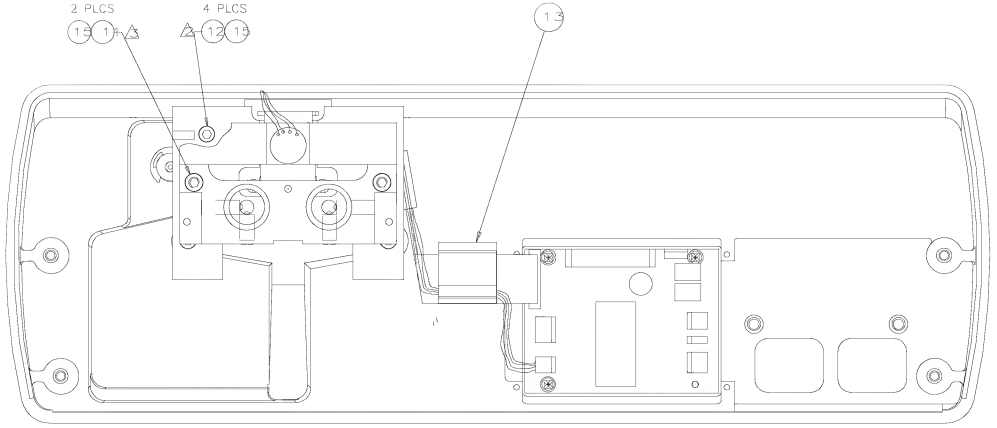
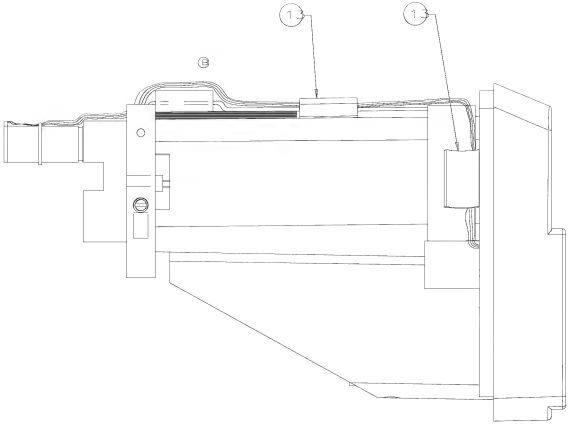
REV	DESCRIPTION	ECN	INIT	DATE	APPR
A	RELEASE TO PRODUCTION	S-3C762	JAN	6/20/95	SGS
B	ADD'D TAPE (ITEM 17)	S-3C855	CRW	7/11/95	SGS



SECTION A-A



PART NO.	DESCRIPTION			
MATERIAL:	DRAWN	DATE	Welch Allyn	SKANEATELES FALLS, NEW YORK U.S.A.
N/A	PJB	4/3/95		
FINISH:	DESIGNED		TITLE:	
N/A			ASSEMBLY, FRONT PANEL.	
	CHECKED			
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES AND INCLUDE PLATING	PJB	6/20/95		
TOLERANCES: .XX = ±.02 ANGLES: ±1/2 .XXX = ±.005 TOLERANCES PER ANSI Y14.5 REMOVE BURRS & SHARP EDGES EXTERNAL THDS = CLASS - 2A INTERNAL THDS = CLASS - 2B	APPROVED		CODE IDENT. 64475	DRAWING NO. 405015 REV B
	SGS	6/21/95		
	REL TO PROD		SCALE: 1.000 DO NOT SCALE	SHEET 2 OF 2
	RPD	6/22/95		

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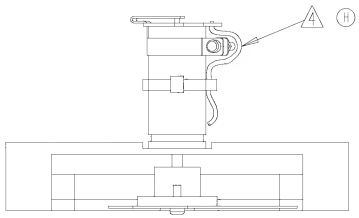
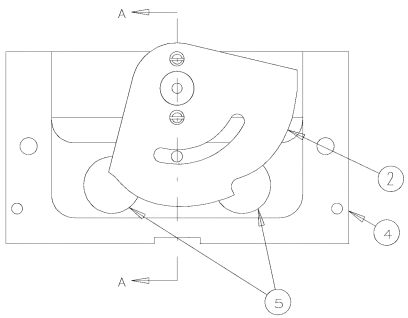
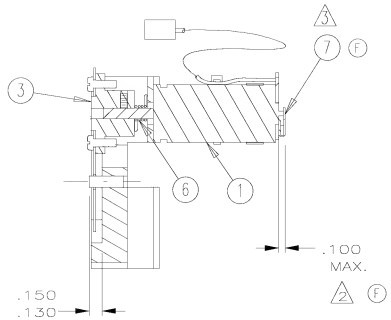
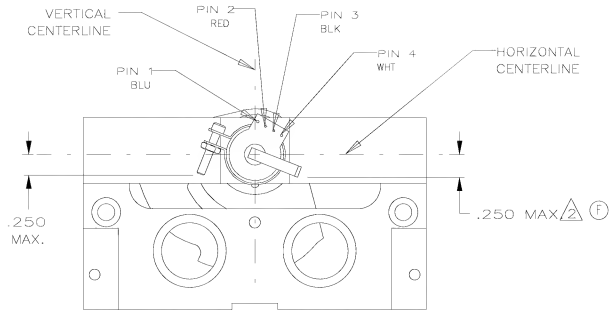
COPIED, OR USED AS A BASIS FOR MANUF ACTURE OR SALE OF EQUIPMENT OR DEVICES WITHOUT WRITTEN PERMISSION.

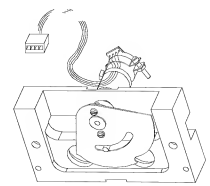
REV	DESCRIPTION	ECN	INIT	DATE	APPR
E	REDRAWN ON MED. FORMAT	5-30543	PJB	5/17/95	SGS
F	ADDED .100 MAX DIMENSION ADDED -501	5-31492	DCS	10/30/95	SGS
G	ADDED NOTE 3	5-32151	PJB	2/5/96	MDL
H	ADDED NOTE 4 PLACE DWG ON "C" FORMAT	5-34680	PJB	2/10/97	SGS











NOTES:

1. SUPPLIER: WELCH ALLYN IPD DIVISION.
   PT. NO. 807946

(F) 2 CRITICAL.

(G) 3 ITEM 7 MAY BE LOCATED EITHER SIDE OF VERTICAL CENTERLINE.

(H) 4 ROUTE WIRES OVER CLAMP ON MOTOR CLIP AS SHOWN, IF ALIGNMENT OF BOTH OCUR.

-502	REV. F AND ABOVE
-501	THIS DRAWING
PART NO.	DESCRIPTION

PRO-E FILE: 455220 . ASSEM
MATERIAL: N/A
FINISH: N/A

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES AND INCLUDE PLATING
-TOLERANCES-
.XX = ± .02 ANGLES: ± 1/2°
.XXX = ± 005
TOLERANCES PER ANSI Y14.5
REMOVE BURRS & SHARP EDGES
EXTERNAL THDS = CLASS - 2A
INTERNAL THDS = CLASS - 2B

DRAWN PJB	DATE 5/16/95	Welch Allyn SKANEATELES FALLS, NEW YORK U.S.A.	
DESIGNED		TITLE: LIGHT ATTENUATOR ASSEMBLY	
CHECKED PJB	5/17/95		
APPROVED SGS	5/18/95	CODE IDENT 55475 C	DRAWING NO. 455220 REV H
REL TO PROD EPN	5/22/95	SCALE 1:1 DO NOT SCALE	SHEET 1 OF 1

455220

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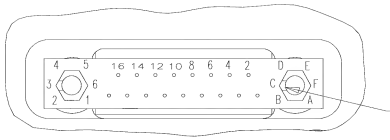
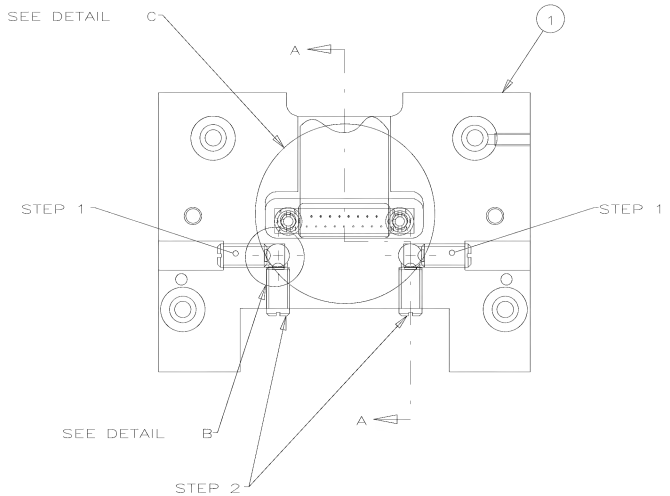
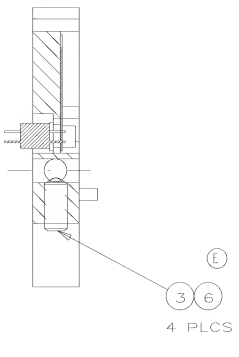
REV	DESCRIPTION ECN		INIT	DATE	APPR
A	RELEASE TO PRODUCTION	5–30676	PJB	6/2/95	SGS
B	NOTE#1 WAS "TORQUE TO 4 ±1 IN.LBS."	5–31059	FCC	8/10/95	SGS
C	ADD ITEM 4 IN SECTION A–A, ADD NOTE 5.	5–31487	PJB	10/31/95	SGS
D	ADD –502 AND DESCRIPTION FOR –501	5–32345	PJB	3/14/97	SGS
E	REMOVED NOTE 5, BALLON 6 WAS 4	5–34129	PJB	11/20/96	SGS



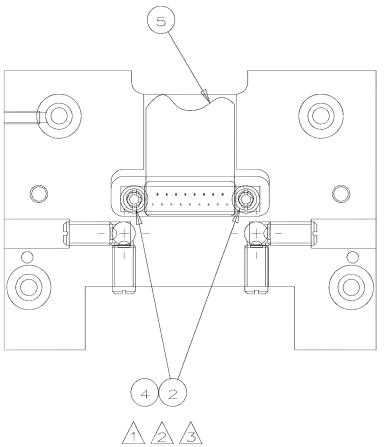
ORIENT NOTCH IN HEX CONNECTOR AS SHO WN.
2 PLCS.

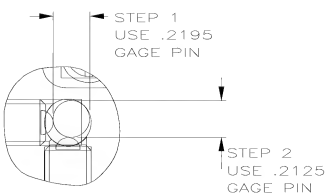
DETAIL C
SCALE 2.000





SECTION A–A





DETAIL B
SCALE 2.000
3 BALL DETENT SETTING
2 PLCS AT STEP 1
2 PLCS AT STEP 2

NOTES:

B 1 TORQUE TO 56 ±8 IN.OZ.

2 HYPERTRONICS CONNECTOR MUST BE FREE TO FLOAT WITHIN OPENING.

3 GAGE PIN USED TO SET BALL DETENT DEP TH.
.0010 UNDERSIZED PIN TO PASS THROUGH FREELY.

4 DISCARD PLASTIC WASHER SUPPLIED WITH HYPERTRONICS CONNECTOR,
REPLACE WITH ITEM #2 (2) PLCS.

D

–502	45500 VLX–20 ASSEMBLY				
–501	40500 VLX–10 ASSEMBLY				
PART NO. DESCRIPT IO N					
MATERIAL:	DRAWN	DATE	Welch Allyn	SKANEATELES FALLS, NEW YORK U.S.A.	
N/A	PJB	2/17/95			
FINISH:	DESIGNED		TITLE:		
N/A			ASSEMBLY, HEAT SINK		
	CHECKED				
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES AND INCLUDE PLATING –TOLERANCES– .XX – ' '.02 ANGLES: ' '1/2 ' .XXX – ' '.005 TOLERANCES PER ANSI Y14.5 REMOVE BURRS & SHARP EDGES EXTERNAL THDS = CLASS – 2A INTERNAL THDS = CLASS – 2B	PJB	6/2/95			
	APPROVED		CODE IDENT 13475	C	DRAWING NO. 405013 REV E
	SGS	6/5/95			
	REL TO PROD		SCALE	DO NOT SCALE	SHEET 1 OF 1
	RPD	6/5/95	1.000		

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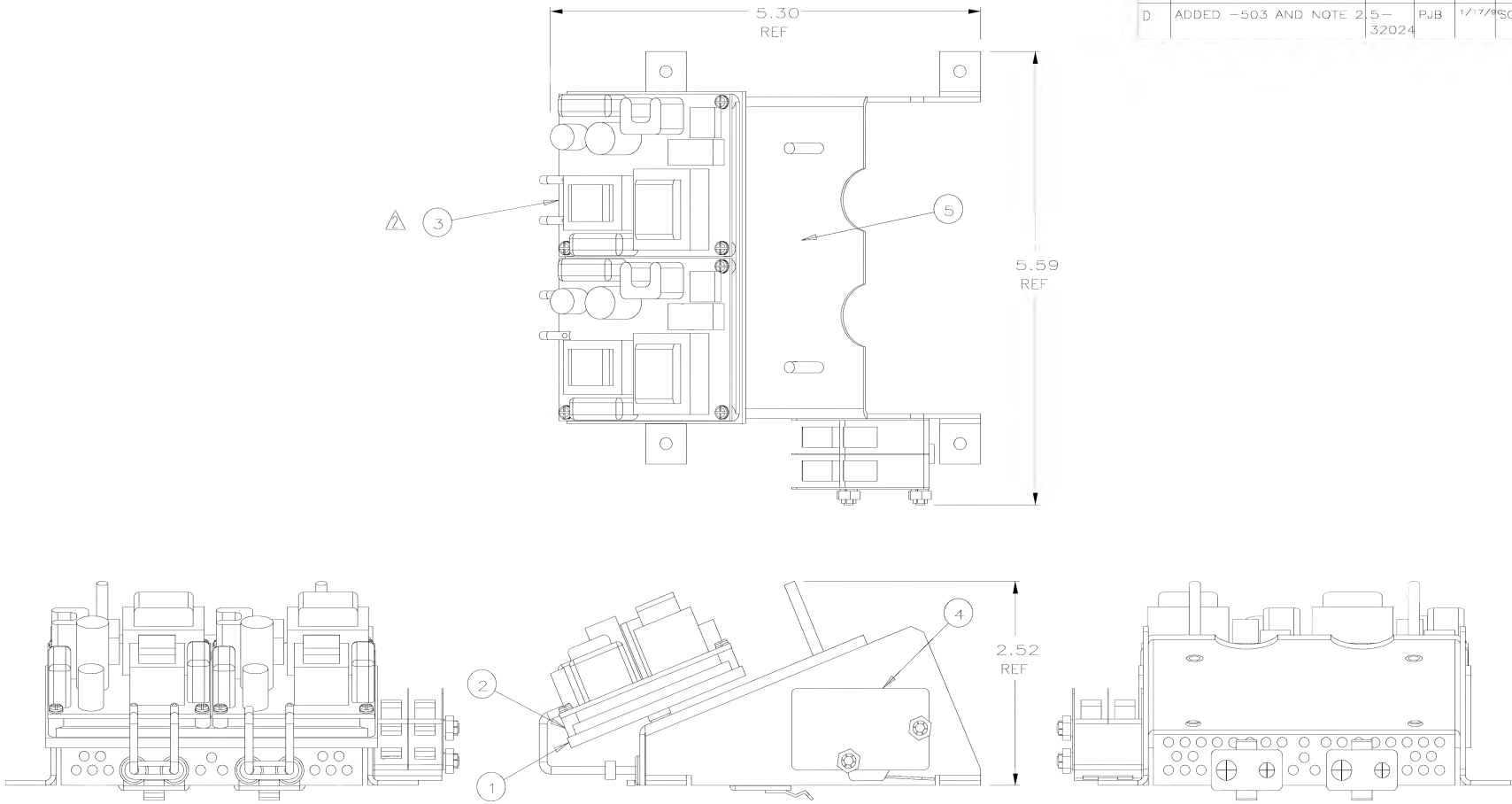
REV	DESCRIPTION	ECN	INIT	DATE	APPR
C	REDRAWN ON MED. FORMAT.	5-30543	PJB	5/17/95	SGS
D	ADDED -503 AND NOTE 2.	5-32024	PJB	1/17/96	SGS



NOTES:

1. SUPPLIER: WELCH ALLYN IPD DIVISION
   PT. NO. 807947

(D) ⚠2 REVISION LEVEL FOR BALLAST BOARD TO BE INDICATED ON BOARD.

(D)

455400-503	THIS DRAWING, REVISION D AND ABOVE.
455400-501	THIS DRAWING

PART NO. DESCRIPTION				
MATERIAL:	DRAWN	DATE	Welch Allyn	SKANEATELES FALLS, NEW YORK U.S.A.
N/A	PJB	5/17/95		
FINISH:	DESIGNED		TITLE:	
N/A			BALLAST BOARD ASSEMBLY	
	CHECKED			
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES AND INCLUDE PLATING -TOLERANCES- XX = ±.02 ANGLES: ±1/2° XXX = ±.005 TOLERANCES PER ANSI Y14.5 REMOVE BURRS & SHARP EDGES EXTERNAL THDS = CLASS - 2A INTERNAL THDS = CLASS - 2B	PJB	5/17/95		
	APPROVED		CODE IDENT 64475	C
	SGS	5/18/95	DRAWING NO. 455400	REV D
	REL TO PROD		SCALE 1.000	DO NOT SCALE
	EPN	5/22/95		SHEET 1 OF 1